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[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

To the Members of the American Gas Institute: All members of the Institute are earnestly requested to send in as soon as possible contributions for this year's Wrinkle Department report. The success of the Department depends entirely on the co-operation and assistance of the members.

Mail all contributions to Milan R. Bump, Editor, No. 60 Wall street, New York city.

BRIEFLY TOLD.

MR. HENRY F. COGGSHALL RETIRES FROM ACTIVE BUSINESS.—It seldom comes in the day of any man to live an active business life for almost the allotted Biblical span of 70 years; but such is the case respecting Mr. Henry F. Coggshall, whose retirement from the dual post of Treasurer and Manager of the Fitchburg (Mass.) Gas Company became effective the 1st inst. This retirement is altogether voluntary, nor was it in any sense caused by physical inability to keep in close, active touch with the policies and progress of the Company which he helped to organize in 1853, and of which he has been the active leader ever since. Born in Mansfield, Conn., December 26, 1823, he engaged in active business life as bookkeeper for the Stoneville cotton mills, the works of which corporation were located in Northville, Conn., when in his 22d year. He rapidly acquired a thorough knowledge of the cotton trade, and eventually removed to Fitchburg, where he became associated with a large firm of cotton factors. About 1850 the young merchant had attracted much attention from his contemporaries in and about Fitchburg, which place then, although a busy spot for the commerce of those times, was the veriest shadow of its present solid self. In 1853 he helped promote the Fitchburg Gas Company, and as a reward for his zealous part in starting it on its way, he was chosen its Treasurer and General Manager. He watched carefully over its welfare, and now, after a service in its cause that covers half a decade over half a century, he retires from it at a period in its existence when it is lustiest and its outlook at least as bright as that of any other corporation within the limits of the city—and Fitchburg shelters several mills the names of which are known, and well known, in every quarter of the globe. Nor did Mr. Coggshall confine himself to the artificial lighting field alone, for as the city grew, and his fame as a business man became better known, naturally he became largely identified with many of its other varied business interests. His public life has been mainly identified with the Park Commission of Fitchburg, and has acted as its Chairman since it was organized. He also represented one of the Fitchburg districts in the Massachusetts Legislature of 1876. The Boston *Herald*, of the 2d inst., in referring to the resignation of Mr. Coggshall, gave this succinct statement of his munificent gift to the city, which well attests his love for the place which has in so many ways benefited by his long residence therein: "He has a fine country residence at Mt. Elam. The Mt. Elam estate he deeded some years ago to the city, giving 100 acres of fine woodland and fields for a park, the house to be his till his death, when it is to revert to the city as part of the park system. This first gift he has since supplemented by another, which brought the city from almost the bottom of the list in park acreage to near the top among the cities and towns of Massachusetts." To the gas fraternity of this country—certainly to all those of 40 years or more—Mr. Coggshall is well known, and in Association work he has ably assisted, as witness his active membership in the New England Association of Gas Engineers, the Guild of Gas Managers, the Society of Gas Lighting and The American Gas Institute. Nor was or is his membership in these bodies of the passive sort. He was a constant attendant at their sessions, and contributed, both by written papers, voiceful discussion and intelligent committee work, to the value of the meetings. To the knowledge of the writer, who has known Mr. Coggshall for almost two-score years, he was one of the pioneers in advocating the joint operation of gas and electric lighting systems, which plan has been in force with his Company since the early eighties. But this, which at the outset was intended only for the briefest sort of mention, has gone to too great a length, still it seems that the going away from active business life of a man who honored his profession while he practised it, should have more than passing thought. Sedate, simple and unostentatious, his achievements were nevertheless many and his successes were pronounced. We

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know quite well that all will wish him, with the writer, a long period in which to rationally enjoy the splendid heritage he holds through deeds well and wisely accomplished.

CURRENT MENTION.—

MR. A. J. GOFF, formerly of Grand Rapids, Mich., is now in active charge of the property and business of the Cadillac (Mich.) Gas Light Company.

THE Massachusetts Board of Gas and Electric Light Commissioners has approved the application of the North Adams Gas Light Company for permission to issue $100,000 bonds to bear interest at the rate of 5 per cent., the proceeds to be used in the payment and cancellation of a like sum of outstanding indebtedness.

THE proprietors of the Georgetown (D. C.) Gas Light Company have brought suit against the District of Columbia, and E. G. Davis, Tax Collector for the District, to recover the sum of $1,324.93, representing the amount of tax money paid to prevent the Commissioner from making a confiscatory levy on the Company's property. P. R. Johnson, who informed us of the action, also forwarded the following further explanatory matter respecting the suit: "The plaint alleges that under the laws of the District all gas, electric lighting, and telephone companies are required, before the 1st of August of each year, to make an affidavit of the gross earnings of the Company for the year previous, ending June 30, and pay as a tax 5 per cent. of such earnings. The report filed by the Georgetown Gas Light Company showed that its gross earnings from the sale of gas amounted to $77,228.82, and that from the sale of by-products it had received $26,498.67, making the total receipts from the Company, $103,727.49. The Collector levied the tax upon the whole amount. The Company protested that part of the amount levied on was not derived from the sale of gas but from the sale of by-products not included in the law. The total tax amounted to $5,186.37, and $3,861.74 was offered him as the amount of taxes due. It was refused and payment demanded of the $5,186.37. This amount was paid and suit is now brought to recover $1,324.93, with interest from July 1, the amount of tax which, it is alleged, was levied on the sale of by-products."

"F. J. T.," writing from Cleveland, O., remarks: "The authorities here are looking with glum faces upon the returns made by the Cleveland Gas Light and Coke Company and the Peoples Gas Light Company, of the same city, for income taxation account during the first half of the current year—the decision being altogether due to the spreading use of natural gas. The total amounts paid in on account of the tax (6¼ per cent. on the gross receipts) for the first 6 months was $29,076.30, or well over 25 per cent. less than that for the corresponding period of 1907. For the year 1907 the Companies paid in $70,781, whereas in 1908 they will not pay more than $50,000. The record payment year was 1903, when the turnover amounted to $97,451.92. However, one "can't have his cake and eat it."

THE above mention recalls the fact that the sum turned into the City Treasury by the Providence (R. I.) Gas Company, on account of gross income tax for the quarter ended June 30, 1908, was $6,461.59; for the corresponding quarter in 1907 the sum was $6,750.75 - a shrinkage of $289.16, and a reflex of the hard times. The figures on similar account submitted by the Narragansett Electric Lighting Company are interesting by comparison with those above noted. During the same periods the taxes paid were, respectively, $10,192.35 and $10,980.29.

MESSRS. L. W. TURNER, H. Grimm and Guy Mead have incorporated the Blair (Neb.) Gas Company with a paid-up capital of $25,000. L. W. Turner, whose address is Ord, Neb., is the moving spirit and a water gas plant will in all probability be constructed.

MR. A. B. SLATER, under date of July 17th, in a letter from Rio Janeiro, informs us that he is retiring from business in Brazil and will shortly return to the United States.

AT the annual meeting of the Equitable Illuminating Gas Light Company, of Philadelphia, held in Philadelphia the 3d inst., the following Directors were elected: Walton Clark, D. H. Lane, Lewis Lillie, W. F. Douthirt and Jas. Ball.

THE property and contracts of the City Gas Company, of Los Angeles, Cal., will, on the 1st prox., come under control of the Pacific Light and Power Company, which corporation is under the domination of H. E. Huntington and associates. This ends all direct opposition to the business interests of the Los Angeles Gas and Electric Company.

AT the annual meeting of the Fall River (Mass) Gas Company it was voted to order a reduction of 5 cents in the selling rate (from 90 cents to 85 cents per 1,000 cubic feet), to become effective with the bills sent out November 1st. The officers elected were: Directors, A. D. Foster, E. S. Webster, G. M. Lane, G. C. Lee, Philip Dexter, Chas. F. Prichard and Russell Robb; President, Russell Robb; Vice-President, F. S. Pratt; Treasurer, A. S. Pratt; Clerk, Alvin Todd.

MR. ARTHUR WILLIAMS has been elected President of the Laclede Gas Light Company, of St. Louis, vice Mr. W. V. N. Powelson, resigned. How many and how frequent are the changes in the official members of corporations with which Mr. John I. Beggs is connected!

THE annual reports of the American Gas and Electric Company, of Philadelphia, show that its net earnings for the twelvemonth ended June 30, 1908, exceed those of the preceding twelvemonth by 19.10 per cent.

Ball Bearings in Gas Fixtures.

[Prepared for the JOURNAL, by ENGINEER.]

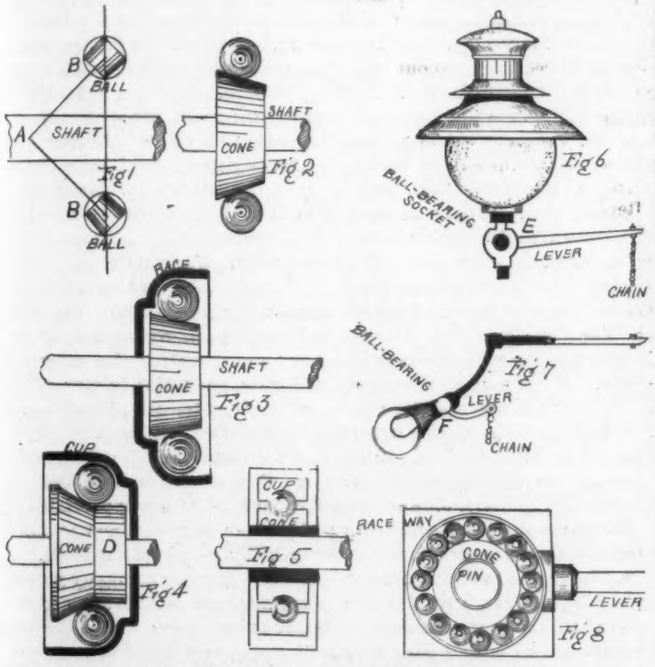
I notice that the manufacturers of gas fixtures are introducing ball bearings for use in sockets and journals of the bearings of levers, snaps, movable cams, throat-pins and various other parts of the gas fixture in which there are frictional parts, with the object of making as little friction as possible in the surfaces which contact. If you take two flat surfaces and move them one on the another, you can develop quite a friction, and if you apply a lubricant between the parts the oil films will act as means for reducing the friction, making it possible for the contacting surfaces to vibrate to-and-fro easily. This action, however, can be reduced to a more complete absence of friction by using rolls or balls. The latter are almost always employed. The principle of their action in the bearings of gas fixtures is identical with the like principle of action in the bearings of machinery of any kind. This principle is illustrated in the cuts. Supposing, first we take the combination shown in Fig. 1. Here we see a shaft and two balls; we can imagine that the cone is there. These balls are ordinarily supposed to roll about the circumference of the cone in making the circle thereof, but in reality they do much spinning in getting around the cone. They spin on their own axis, therefore a combination of rolling and spinning motion is acquired by them in describing the circle over the cone. This motion takes the alignment from the center *A* on the shaft to *B*, *B*.

If in anyway the parts adjusted get out of this alignment, the balls, cone and raceway will not operate in harmony. Therefore, in defining the adjustment of the combination, we must take into consideration the cone, exhibited in Fig. 3; the complete outfit is shown in Fig. 3, in which the black portion represents the case or raceway of the bearings. This, too, has to be properly set in order to make the balls run in the proper line on the cone. I have seen many of the bearings of fixtures rendered useless so far as the ball bearing part is concerned by the setting of the cone so tightly against the balls that they bind on the cup or race and unnecessary friction results. Then, again, there has been a tendency to employ too many balls in the bearings. When ball bearings first came out the manufacturers employed a great many small sized ones in each bearing, but it was soon discovered that less friction is produced and higher speed warranted when the balls are fewer in number and larger in size. Therefore, in the designing and construction of the modern types of ball bearings for gas fixture service, you will find that the balls are of good proportions and of ample size for the work intended. Then in the gas fixture bearing you have to take into consideration the fact that there is not very much action, as the bearing is not used for constantly revolving service as in a machine which produces something. The bearing is simply for the purpose of retaining the stud or pin socket of a lever for opening and shutting valves; or for purposes of igniting and extinguishing jets; or for using in connection with automatically operated gas arcs; or for controlling shafts which have to make movements on surfaces in the various operations of modern self-regulating lamps. Therefore, the element of excessive speed of the movable shaft in the bearing is not considered. The object is to get a shaft in the bearing which shall respond readily to a nob, a cord-line, a touch of the finger or whatever other agency is employed to set the mechanism into working condition. Nearly all of the gas fixture bearings are light as a result, and many of them are of thin-shelled metal contrivances. Some are calculated to be operated indefinitely without oil, while others need a drop of lubricant deposited in the balls on the case and on the cup at long intervals. Of course the bearings used in gas lighting service are exposed to the action of the dust in the air to a more or less degree, therefore, while many of the bearings are not heavily constructed, some of them are provided with an additional outer protecting case of thin brass to keep the foreign particles from the atmosphere from getting into the parts.

I notice that some designs of ball bearings for gas fixtures are constructed on the plan exhibited in Fig. 4. The cone is made with a shoulder, which style of cone has been used with considerable success in many types of bearings of both large and small caliber. Further, some of the bearings are built on the plan of that shown in Fig. 5, where the balls are arranged to roll between the oval groove of cup and cone, as shown.

Several different designs of cones and cups are employed, some of which are of the 2-point style in which the ball contacts with the cup at one point only and the cone at one point. In other styles 3-point bearings are used, in which the balls contact on two surfaces on the raceway, due to having the raceway shaped at an angle inside. The

next illustrations show some of the plans in which the ball bearing levers are used. The lever for the manipulation of the lamp is fitted with a ball bearing at *E*, from which fact the lever can be operated more readily. A spring of the spiral type is used to keep the lever elevated to its proper position, therefore the chain can be used to draw down on the lever whenever necessary. Or the arrangement may be as in Fig. 7, in which the lever is furnished with ball bearings at *F*. Of course, the up-to-date manufacturer of fixtures is obliged to adopt these apparently unnecessary equipments oftentimes, just to keep up with the times. As the ball bearing bicycle, the ball bearing carpet sweeper and the ball bearing something else took a jump in sales as soon as the manufacturers began advertising the merits of devices furnished with ball bearings, so are the ball bearing movable parts of gas fixtures selling well. People like novelties and are ready to try new things. While ball bearings do not reduce very much friction in movable parts of gas fixtures, they help a little, and every



little counts. The "Ball bearing gas fixture" sounds up-to-date. Fig. 8 is a full side view showing the balls in position.

[Continued from Page 184.]

FOURTH ANNUAL MEETING, IOWA DISTRICT GAS ASSOCIATION.

Held at Omaha, Neb., June 17, 18 and 19, 1908.

Second Day—Morning Session.

The session opened at 10 o'clock with President Haines in the Chair. Mr. W. E. Davis, of South Omaha, Kas., read the following paper:

A GAS MANAGER'S RELATION TO THE PUBLIC AND TO THE EMPLOYEES OF HIS COMPANY.

[For the text of the Davis paper, see Journal, *ante*, p. 57.]

Discussion.

Mr. Houck—Owing to the fact of my infancy in the gas business, and believing that one should walk before he talks, I feel that it is nothing short of rank presumption on my part to either criticise or enlarge on so able a paper as the one just read. My limited experience in the gas business leads me to believe that the average gas manager needs an unlimited amount of that attribute of character enjoyed by the old gentleman we have heard so much about in the Sunday School class. I think one of the most important things for the manager to use is great care and discretion in the selection of the employees having the most to do with the consumers. The man who is careful not to track through the house with muddy feet, who does not leave partially burned matches and other litter about the house, who is courteous and gentlemanly to every member of the family, who is observant while appearing not to be, quick and efficient, is a pearl without price and should be handled as outlined by Mr. Davis.

Mr. Carson—The manager of the corporation is the one by whom the corporation is judged as to its policy and its relation to the people. He certainly has to have a great deal of tact and ability in handling human nature. There are so many different kinds of people, reasonable and unreasonable, that the manager's patience is often tried, but if he can keep his head and satisfy them, it is time and energy well spent. One feature I think was not brought out strongly enough, is our attitude toward the press. I thoroughly believe in newspaper advertising. While some corporations take the stand that they are the only gas company in town, and if people want gas they know where they can get it, it is not a policy that will win out. I believe you get direct returns from advertising, and that the manager who will adopt that policy and continue it will find it one of the best anchors to windward that can be thrown out.

Mr. Hensinger—I think advertising in newspapers is a very good idea, whether we are the only gas company in town or not. We advertise in the papers, and also by means of souvenirs, etc., such as this. [Showing a fountain pen inscribed "Cook with gas"]

Mr. Crawford—This matter of advertising is one of the principal things for a gas company to keep in mind. I frequently clip articles from the gas Journals and have them published, as well as our regular advertisement. We believe in spending considerable money for advertising, thinking it is good policy, that it educates the people and expresses good nature.

The President—The main subject of this paper was the gas manager's relation to the public, and I think it would be a good idea to have some expression as to his attitude toward organizations in the town and in relation to donations made to charitable institutions and progressive institutions for the benefit of the town.

Mr. Kellogg—The question of donations is one that must be handled with a good deal of care and judgment. If you give $500 to a Presbyterian hospital and the Catholics also build one, you will have to donate the same amount to that. Our Company makes donations of that character, but it is a tax that grows on you all the time.

Mr. Clabaugh—I think the gas company should contribute liberally to everything that is for the upbuilding of the town, and the Omaha Gas Company has never been in the background in that regard; but when we take all these promiscuous donations it is pretty hard to draw the line. We are representatives of certain stockholders of our corporations, and have we the right to contribute as we as managers see fit. You remember these insurance companies in New York got into a good deal of trouble several years ago from that very thing. Whether we are treading on that ground or not is a question, but I don't believe we have the right to hand out our companies' money without absolute authority from the stockholders. I think it is well that every company should lay aside a certain amount for charities or donations—whatever you choose to call them—leaving it to the manager as to how it should be distributed; but it does not seem right that the manager should take upon himself to help along everything, good, bad and indifferent. It is very hard to send them out without giving them something, but it is getting to be a very great burden, not only from the amount of money that is being put out, but from the effect it has. We all know that we make paupers by giving money, but to help a man is a different proposition. We are not making paupers of these charitable institutions, it is true, but we are letting them put aside their energies in their efforts to raise money legitimately. Of course, there are exceptions to all these things, but many people think they can get people to contribute to any cause, and that is the class of people with whom we have to be careful.

Mr. Waring—I would like to have a little more discussion in regard to the gas manager's relation to the employees of his company—for instance, with regard to this social betterment proposition which is being agitated all over the country. My experience is that we should go very slow on it. I think we can't follow the European idea. The American doesn't want anything but good wages and fair treatment. When we give him clubs, libraries and all that, he thinks it is taking away from his wages. If you do too much for your employees they misunderstand it, and feel that you might put the money to better advantage by giving it direct to them, They would rather have it on their wages than in these libraries aud other features. I think Mr. Roper has had some experience, and I know he has made quite a study of the social betterment proposition. I would like to hear from him on that subject.

Mr. Roper—I hoped they wouldn't take me for a gas man. Some years ago it was the custom in our town to give the married man a turkey and the single men a dollar on Christmas, and I think all the old-fashioned manufacturers there are still doing it. We have never given a man anything except what he worked for. We don't have

any clubs around the place, and don't give them any balls or picnics, or excursions or anything of that nature, and never have had any trouble with our help. We had only one strike, and then they were so sorry for it they didn't know what to do. Take the case of Pullman a number of years ago. There were any number of men who would rather live in a room over a saloon or any other old place, because they didn't want to be dictated to. I want to say something in regard to this donation business in which I have had a little experience. I have never allowed an hospital, the police force, the fire department, the Women's Aid Society or the other Women's Relief Corps in our town to pay me a dollar, and I have done all their work —given them appliances, nickel-plated their knives, forks and spoons, burned the japan off their trays and re-japanned them, etc. When a man is hurt, as happens occasionally, we send him to the hospital and pay all his bills, and we don't pay his wages. If he is needy, we make him a donation. Some years ago I sent a man to a hospital, and after holding him there about an hour they telephoned down and wanted to know who was going to pay the bill. He had one finger sawed off and the ends of two more. I sent word back that after sending as many men there as we had, I thought they ought to know what we would do. From that day to this I have charged the Rockford Hospital and the other one for everything we have done for them, but I have never sent them a bill; that is, I have never tried to collect it. It stands as a credit on the books and I give them a statement of it at the end of every year, so that when I send a man up they take care of him and apply it on that credit.

Mr. Parker—About a year ago, in East St. Louis, I was invited over to see the club rooms that were fixed up for the employees of the gas company. They had rented 4 rooms over a vacant store and fitted them up with a second-hand pool table, gas range, etc., and they were all elated with its success. A short time ago I was down there and said to Mr. Quackenbush, "Let's go over to the club rooms." But he said no, there wasn't anybody there and they had lost all interest in it. I just mention that to show how quickly the enthusiasm dies out. These club rooms were presented to those boys at no charge, but they didn't seem to appreciate it. If the employees had fitted them up themselves they would have taken an interest in it.

Mr. Roper—Some 5 years ago we had a very hot summer and I put shower baths in the foundry. A man never wears on the street the clothes he pours off in, as they would be decidedly sweaty and dirty from the sand when they finished work. We put in 4 shower baths with the idea they would use them. I don't believe that they were ever used 50 times by all of them, although there were 75 men working. As one man told me, if he had a bath tub he wanted it at home.

Mr. Crawford—I think the experience of the National Cash Register Company is the most noteworthy. If you look up the record of that trouble down there it will satisfy most anybody. There is an example of spending money to help the employees along.

Mr. Lea—The National Register case is the most prominent, because they spent their money more in putting on the frills. The Westinghouse Company has some very large foundries at Wilmerding, and it is not a desirable place to live. About 3,000 men were employed in the foundry, and most of them had to come back about 16 miles toward Pittsburgh to live. Associations were organized in the Westinghouse industries to build houses in the locality of the foundries. They did some building but there did not seem to be any attraction, although the terms of payment were practically what the same men were paying for rent, which would have applied on the ownership of the house. Then the Westinghouse people built hotels—a great many of its employees are single men. They built a 7-story hotel at Wilmerding, which was equipped as nicely as the average 7 story hotel in this country; but from the time it was opened, I am told, there was never a time when 10 per cent. of its capacity was used, and most of the time it has been used by people who went there for a few days at a time. The men could have lived there for considerably less than they were paying for rooms scattered about, but it didn't seem to have the slightest attraction. The principal objection seemed to be that it was owned by the Company and dictated by it, and they would rather spend their money as they saw fit.

Mr. Carson—This brings out the point that to give money or help directly will tend to make people dependent, and I believe the average person would rather be paid in wages and get what he works for than to have these bounties handed out indirectly. I believe the employer has a direct interest, not only selfish but unselfish, in the upbuilding of his employees; but of late years conditions have changed, so that really it seems what he has done or may do will be misinterpreted, consequently he loses heart and figures that he will pay them for just what he receives and no more. The experience of the Pullman Company, the National Cash Register Company, and other like large institutions, it seems to me, fully demonstrates the fact that, in the majority of cases, the intention is misinterpreted. It calls to mind an incident that I heard regarding the charities of one of the large cities of this country, where the poor women and their families were taken out during the summer on what was termed the Fresh Air Fund. They were taken out to the lakes and given an outing for a week with their children free of charge. One of these individuals—I may call them—came back and said that "It was very nice, but the service was very poor." I heard Elizabeth Cady Stanton make a remark a great many years ago that I will never forget. She said the Bible sanctioned the use of tobacco by men; there was no question about it. She referred to that phrase, "Let those who are filthy be filthy still." I think that will apply.

Mr. Roper I want to correct an exaggerated statement that may give a false impression. The crippled children from Chicago have for 3 summers spent a week in our town, and I have myself hitched up a team and taken 6 or 8 out in a wagon, and of all the things that has ever been done by our town I don't know of anything that has ever given better satisfaction. I don't know of any lot of children that ever had any better time and appreciated more what was done for them. They would see things of interest that you would drive by and never notice. Coming back to the factory part of it, I have discussed that a number of times, especially in the Electrical Manufacturers' Association. What you have to do is to educate the men up to the point where they really know what a bathtub is, and then it is up to them just the same as it is to anybody else. When they can be taught to spit in a box of sawdust instead of on the floor, and use an enameled wash basin with some kind of decency, it is time to put in a bathtub.

The President—This discussion is perhaps straying a little away, although the remarks have been very appropriate to the general subject. It has seemed to me that, as a rule, gratuities to men who are independent are resented; but by people who are dependent, like crippled children, are generally appreciated. The preparation of club houses and things of that kind for employees is not appreciated unless the employees pay for them themselves; and on that same principle, public buildings, statutes, parks, etc., are appreciated more by the people of the community when they pay for them themselves than if they are paid for by a few wealthy people of the town. That is, if you want to have a park, instead of the gas company giving its money in a large sum, or the manufacturers in the town giving a large sum to it, if you have a 25-cent subscription of all the people in the town for that park they will appreciate it and take more care of it than if the money was raised in any other way. I think those are more or less psychological principles that have been demonstrated particularly in the last few years.

On motion a vote of thanks was tendered Mr. Davis for his paper.

The paper on

THE COMPARATIVE VALUE OF FUELS AVAILABLE IN THE IOWA DISTRICT

next occupied the attention of the Association.

[For the text of the paper, see JOURNAL, *ante*, p. 139.]

Discussion.

Mr. Vincent—I would like to call attention to the thermal value of that Illinois and Iowa coal. I think it would have to be a very carefully selected coal to give anything like that value. The average Iowa steam coal will not run over 11,000, and it doesn't begin to compare with Pennsylvania, Wyoming ond Colorado coals as a steam coal. An analysis of Iowa steam coal will generally show, in round numbers, 30 per cent. fixed carbon, 35 per cent. volatile, and the balance ash and moisture, running about 25 per cent. and 10 per cent., respectively.

Mr. Waring—I think those samples were taken from the mines by the United States Government and forwarded to St. Louis. I think Mr. Taylor can tell you just how and by whom they were taken.

Mr. Taylor—In each case the government sent a representative to the mines and secured a sample of coal, which was taken to St. Louis, either personally by the representative, or else in a sealed package, so there was no chance of any substitution being made. They went even farther and made tests on car samples. It would pay all of the members of this Association to secure those reports. One known as "Professional Paper, No. 48,' contains practically all of the tests on coal, the information in regard to the fields from which it was derived, also the results of the boiler and gas tests, etc. This paper can be secured from the Superintendent of Documents at Washington.

Those tests show when the government takes up the matter that the number of B.T.U.'s is not the final factor in determining the efficiency of that fuel for steam boiler purposes. There are other factors, such as the percentage of sulphur and the amount of ash, that in various ways affect the burning of the coal. For instance, the coal that is highest in ash is not necessarily always the lowest in efficiency. The coal may show a small amount of ash and a high amount of sulphur and will clinker very badly, and clinkering makes the fire very hard to handle, so that the efficiency is lost to a certain extent; whereas a coal high in ash but low in sulphur, and having probably a lower heating power per pound of coal, will very often give a better efficiency. One thing is to be reckoned with when considering the subject of the boiler furnaces used in this part of the country. The average boiler setting was gotten up a great many years ago for burning anthracite coal, and these boilers have not combustion space enough to complete the combustion of the volatile matter, which all of the coals in this region are high in. I believe to burn the coal of this region successfully it is necessary to have a large combustion space and a low-range setting, probably on the order of the old Dutch oven, so that the volatile gas distilled from the coal does not come in contact with the boiler tubes. You know that oxygen mixed with the gases will not combine and burn if the temperature of the gas is below a certain point. This has been taken up very fully by the Illinois Manufacturers' Association, and the Bulletins of the University of Illinois on the subject are very interesting. They show the advantages derived and the improvement that results by adapting the boiler setting to the coal to be used.

Mr. Crawford—I have that bulletin of the U. S. Geological Survey, and am personally acquainted with Prof. Breckinridge who has charge of the tests and saw a good many of them made. Some very interesting tests on producer gas were made there also; also, tests on peat. While that subject is not at present interesting to the members here, we have a company in Clinton owning about 20,000 acres of peat land. The beds will run from 12 to 15 feet deep. I have taken up with Prof. Breckinridge the problem of making gas out of peat; in fact we have tried it. We ran peat 1 day in 4 benches of sixes, but of course we did n't have the candle power necessary and had to enrich with water gas; but it is a proposition that will come up one of these days, and I think that it will eventually develop into a commercial success.

The President—Did you have the peat analyzed?

Mr. Crawford—No, but I got an analysis of peat mined in Missouri, and at another point. When peat is mined it loses 80 per cent. of its weight upon being taken from the water and exposed to air, but it works finely in a producer gas machine, making blue gas which has a high calorific value, and the problem is going to be successfully worked out some time.

The President—Where are those peat beds?

Mr. Crawford—Around Fulton, Ills., across the river from Clinton. But there is much peat in Iowa in the marshes, and I know there must be peat east of Omaha.

Mr. Vincent—I understand these analyses were made by the United States Government and the samples were selected with a great deal of care. Also it is a fact that at Ames they have analyzed a large number of samples of coal from the Des Moines district and gotten from it 11,000 to 12,000 B.T.U. The other day I had occasion to make up an average of analyses made on about 12 samples of Iowa steam coal selected with care from various carloads coming from four different mines in Iowa, and, omitting the decimals, the analysis was about as follows:

Moisture	11 per cent.
Volatile	34 "
Carbon	30 "
Ash	25 "

I did not figure the rest of it, but imagine that will give about 8,000 B.T.U. net, including moisture. These analyses were made in a laboratory in which the accuracy of the work was absolutely unquestioned and the coals were selected from several carloads. Several years ago the question came up, in fact it comes up right along in gas companies that are located in the Des Moines coal fields, as to why they couldn't make gas out of Iowa coal. Some tests were made in Des Moines, using selected Iowa coal from the Des Moines district. The first test was made by mixing 175,000 pounds of Pennsylvania Youghiogheny with 76,000 pounds of native coal.

Gas made, corrected	931,000 cubic feet.
Yield per pound coal (mixed) carbonized	3.68 "
Yield per ton of coal (mixed)	7,360 "
Candle power	16.84
Candle feet	61.97
Pounds coke made { Youghiogheny 112,344	65 per cent.
Pounds coke made { Native 34,532	45 "
Pounds coke used in furnaces 34,532	26½ "
Pounds coke saved, Youghiogheny 107,444	95 "
Average weight of charge	276 pounds.
Tar made { Youghiogheny	1,007 gallons.
Tar made { Native	306 "

The second test was made on native coal only, with results as follows:

Pounds coal carbonized	28,700
Cubic feet gas made (corrected)	69,000
Yield per pound coal	2.40
Yield per ton coal	4,800
Candle power	16.9
Candle feet	40.36
Pounds coke made 12,629	44¾ per cent.
Pounds coke used in furnace 4,260	33 "
Pounds coke saved 8,368	
Average weight of charge, pounds 265	

In this test every effort was made to keep the heats up and the fires in good condition, but after about 24 hours the heats were very bad and the furnace a mass of clinker. The coke was practically worthless. To test it it was forked from pile into cart, weighed, emptied and forked back again and weighed three times. The third weighing showed a loss of about 40 per cent. Of course, it illustrates what most of us know, the absolute worthlessness of Iowa coal for gas making.

Mr. Carson—One point that I would like to hear discussed is the use of soft coal under the benches. I believe that is a very important question in the economical production of gas. Our experience has been that we can get equal results, pound for pound, by using soft coal under the benches, as with coke made from the Pennsylvania coal; that being the case, it effects quite a saving in the expense of operating the works. We have been able, by selecting Illinois coal, to carbonize 5,000 pounds of Pennsylvania coal with 1,500 pounds of soft coal, mine-run, and there is really no more trouble with clinkering and taking care of the fires than when the men were using coke. At first they rather objected to it, more from fear than anything else, because they had never used it; but after they had once adopted it they really preferred it to coke under the benches.

Mr. Vincent—Does Mr. Carson use direct fire or generator settings?

Mr. Carson—We use gas coal in ¾-depth generator settings.

The President—We used local fuel in our benches in Des Moines until we shut the coal gas plant down. The Iowa coal, which is comparatively high in volatile and very low in carbon, is naturally productive of a great deal of smoke when burning. Mr. Taylor referred in his discussion to the fact that the furnaces are not constructed right for burning the coal, and we find that taken up in a good many cities now because of the smoke nuisance. In burning this coal under the retorts it is used under very advantageous circumstances, because the benches are hot, and the volatile gases and smoke are kept at a very high temperature until they are finally burned by the secondary air, and in that way you get a more complete combustion. I suppose the theory in burning this Iowa coal under the boilers will eventually be to develop a more complete combustion by the introduction of heated secondary air or a larger fire-box.

An extended discussion here followed as to the respective merits of various brands of coal and coke, participated in by Messrs. Crawford, Carson, Chubb, Vincent, Glenn, Averill, Taylor, Waring, McLean, Lea and Honeywell. Upon motion, a vote of thanks was extended to Mr. Honeywell for his paper, and a recess was thereupon taken to 2 P.M.

(To be Continued.)

[Continued from Page 189.]

FIRST ANNUAL MEETING, CANADIAN GAS ASSOCIATION.

Held in the King Edward Hotel, Toronto, June 26 and 27, 1908.

First Day—Afternoon Session.

President Powell called the meeting to order at 3:40 P.M.

Letter of Regret.

The Secretary read a letter of regret from Mr. W. H. Pearson, regretting his inability to attend the sessions of the Association.

The President—We have a very able representative of Mr. W. H. Pearson, Sr. in the person of Mr. W. H. Pearson, Jr., who is here today. Personally, I greatly regret that Mr. Pearson is not able to be

present with us. He stands high in the estimation of the Association, and is well known for his technical skill. I move that we express our regret at his not being able to be with us. [Carried with applause.] I have pleasure now in introducing Mr. W. H. Pearson, Jr., who will favor us with his paper on

PRODUCER GAS-FIRED RETORT BENCHES.[1]

For many years the writer has had in mind the idea of heating retort benches by means of producer gas obtained from outside producers. On a recent tour of the Continent I visited most of the important gas plants, among them the Provan gas works at Glasgow. There, for the first time, I saw the long contemplated process of heating retort benches by means of producer gas in operation. Through the courtesy of the Engineer, Mr. Alexander Wilson, M.I.C.E., I was given every opportunity of examining the plant and of going fully into the results obtained from it.

These results appeared so eminently satisfactory in every way that, upon making my report to the Company, the general scheme was adopted. At a later date the contract for its erection was awarded to Messrs. Drakes, Limited, of Halifax, England. My reasons for adopting this style of gaseous firing were as follows:

1. Perfect regulation of heats and benches,
2. Small cost of renewals and repairs.
3. Saving in labor and operating.

Regulation of Heats.—1. Referring to the regulation of heats, it will readily be seen there would be but slight variations in the heats, as there would be a steady flow of producer gas of an approximately constant composition. This will decrease, to a very large extent, the difficulty now experienced with the ordinary method of firing and of maintaining the heats at an equable temperature. This undue raising or lowering of the heats—as the case may be—is caused in a great measure by the cleaning and charging of the fires at regular intervals, and consequently will be abolished under the new system. Hence, many of the evils directly traceable to varied and uneven heating, such as pitched tar and hydraulic mains, stopped standpipes, lampblack formation, etc., will be entirely done away with.

Cost of Renewals and Repairs.—2. As to the cost of renewals and repairs, benches constructed for the purpose of using producer gas would have a very much longer life than under the usual firing system.

Since there is no furnace, and consequently no clinkering, there is very little probability of choking or burning out in the generator part of the setting. Also, the perfect regulation and even distribution of the gases to the proper portion of the bench around the retorts would greatly lengthen the life of the whole setting At the present time, in the majority of benches of 9's or 12's, it is the center portion which gives out long before the rest of the bench is out of service, thus necessitating the renewals of the setting.

Labor and Operation Costs.—3. With regard to the cost of labor and operation under the present system. A large proportion of the labor necessary for operating would also be responsible for the clinkering and cleaning of the fires, of which there is generally one for each bench of retorts. When firing producer gas, one or two generators, as the case may be, are used. These are controlled by one or two men on each shift, the number depending upon the quantity produced. Thus a large amount of labor is saved, which would otherwise be necessary for the cleaning and clinkering of the benches, as described in the preceding paragraph. Considerable labor would also be saved in the operations on the stage floor, as, by the introduction of the new system, the filling of fires made necessary by the old method will be abolished.

Mention should also be made of the fact that handling coke when firing direct involves the employment of a considerable number of tools and apparatus, which are subjected to great wear and tear. Their use will be totally unnecessary under the new method. In addition to the above-mentioned facts it is expected that a large saving will be effected in the quantity of fuel used for firing the retorts.

New System Better All Around.—Summing up the general results which can reasonably be expected through the introduction of this system, and the better principal reasons for its adoption, we anticipate a better regulation of the heats in the retort house, the reduced cost of labor in operation, the small cost of renewals and repairs, the upkeep of tools, etc., together with a more even production of gas, coke and tar.

I might here illustrate this system of producer gas firing, by comparing it with the present system of cooking by gas and the old manner of cooking with coal or wood. In making such a comparison the regulation of heats will be apparent to all concerned.

In writing this brief description of the plant I have purposely avoided giving any figures as to the actual results we hope to obtain. I should prefer at a later date to give you additional and fuller information on this subject. This paper is merely for the purpose of making a preliminary explanation of the plant now in course of construction, before having the pleasure of your company upon it, in order that you may gather some slight idea of what we hope to accomplish. We anticipate having the plant in operation in the course of 2 or 3 months, and when we meet again I hope to be able to give you actual results obtained.

Discussion.

Mr. Phillip—What is the probable minimum number of retorts that can be economically fired with producer gas?

Mr. Pearson—In quite a number of cases outside producers have been used from 1 to 4 benches, depending entirely upon the size of the benches. I think a producer used with from 4 benches up would be economical. I think one small producer would operate from 4 to 8 benches. In our case we installed benches of 12, 4 tiers high, very similar in size to the ordinary benches of 9's, but a little bit wider. Our object in building benches of 12's was the saving of floor space, for, in using charging machines, height is not a factor in the cost of operation. If we were charging by hand we probably would not build over 3 tiers high, but owing to the use of charging and drawing machines we can go higher and save the extra floor space. In England they are using one producer to each 4 benches. I cannot say whether that is more economical or not.

Mr. Forbes—Would the producer system be adapted to the ordinary generator?

Mr. Pearson—When we constructed our benches we did away with the fireplace entirely, the producer gas being introduced at three different points. At the present time the radiation of heat is such that it affects the center portion of the bench to a greater extent than any other part, and the even distribution of heat is really the great feature. By distributing it evenly throughout the bench one portion will not give out before the other. That would be a rather large item, as the generative portion of the bench would not have to be renewed in many years. You can all realize the saving in the operation of the bench by having the heat applied evenly.

Mr. Forbes—What fuel are you using in the producer?

Mr. Pearson—We have figured on 14 or 16 per cent. per 100 pounds of coal carbonized; but we expect to go on a great deal lower than that. You can realize, when the fire is concentrated in one or two receptacles, that there is a waste from clinkering and a waste in cleaning out the fire. The coal should be picked over, but the men don't do it, so there is a great deal of waste in that way. With the producer this is not the case, for you only have one or two fires, and in the case of the small water gas generator no cleaning out, so that the waste is very small.

Mr. Forbes—Do you provide storage for your producer gas?

Mr. Pearson—None at all. We have the dust flue, which prevents dust going forward and choking up the flues. This is working well in Glasgow, and we have a similar thing here to prevent choking up the flues.

The President—What kind of fuel do you expect to use?

Mr. Pearson—Hot coke, and we intend to measure it into the producers as we use it. We take the coke directly as it comes from the retort without being crushed or screened, the breeze is all used. We We don't screen it at all.

The President—I move we tender Mr. Pearson a vote of thanks for his paper. It certainly marks a great advance in the use of producer gas, and that, together with the saving in the expense of renewing retorts, should be an important feature in accomplishing what we are all after to-day; that is, reducing the cost of manufacturing gas. [Motion for a vote of thanks was adopted.]

The President introduced Mr. C. Forbes, of Ottawa, Ont., who read the following paper on

SOME APPLIANCES USED IN GAS CONSUMPTION:

The facts contained in the following paper, on the uses to which gas can be applied, are mentioned more with the object of originating discussion than with the idea of thoroughly covering the field of gas

1. The author prefaced his paper by remarking that he had written only briefly on the subject, owing mainly to the fact that their new works were not yet in operation, whence the outlining now. The works would be inspected next day, and he fully intended that the Association should have a comprehensive statement when they had been fully tried out in a year or so.

appliances for various purposes. The uses to which gas is applied can properly be divided, I think, under the two heads: "Domestic" and "Industrial."

Under the heading of domestic these divisions would occur:

(a) For lighting; (b) for heating; (c) for cooking.

In the industrial field these divisions might be made:

(a) For heat; (b) for power.

It is needless for me to remark to any of the gentlemen present that during the last few years a great increase in the consumption of gas has taken place under all these heads; the records of your station meters is sufficient evidence of this. The demand in the industrial world for space, money and labor saving appliances, and in domestic life for those things which make for convenience, cleanliness and economy, are responsible for the wider adoption of gas as a heating and power medium and the consequent multiplication of the uses to which our product is now being put.

Dealing first with the use of gas in the home, we find a much greater demand for the luxuries of home life in all departments of domestic economy. In addition, the increased cost of fuel of other kinds has rendered impracticable the waste which their use entails.

For cooking purposes wherever the gas main is laid the gas range has almost entirely supplanted the coal and wood stove, particularly in the summer months. Even where coal and wood are used in winter time, for summer the gas range will be found installed, for the cleanliness, comfort and coolness which it ensures. In the newer houses provision is being made in nearly every case for heating the kitchen from the furnace and gas is used entirely for cooking, thus ensuring the economy which comes from burning the cooking stove only when required. There is no cooking operation which cannot be satisfactorily performed with gas. Indeed, there is no other sort of stove on which all cooking operations can be carried on at once. It is not possible to roast and broil and stew and toast on a coal or wood stove simultaneously, yet with a gas range all these operations can be carried on at once.

Further, it is not necessary to stoop and bend to get at the oven of a modern gas range, and this, combined with the plate warmers and hot closets, are features of great convenience to the housewife.

The economy of fuel in a gas stove is an element of first importance. It is not necessary to keep a fire up all day long in order to cook three meals, nor is any time lost in "starting up a fire." The stove is always available and a hot oven can be obtained in a very few minutes. Then when the cooking is over the fuel consumption ceases forthwith. The instantaneous, automatic water heater is working a transformation in the realm of domestic conveniences. It is being installed in a great number of the higher priced houses. While the initial cost is somewhat high, the fact that its usefulness extends over a large number of years and that it consumes fuel only when in use are arguments in its favor.

For the smaller houses the ordinary water heater, which has to be lighted when in use, is growing in favor. Being attached to the top of the range boiler, these heaters deliver the hot water in the minimum space of time.

In the city of Ottawa, which I have the honor to represent here, the overwhelming proportion of our gas consumption is for heating and cooking purposes. We have educated the people to the advantages of gas through newspaper advertising, circularizing, demonstrating, and lastly (the most efficient) house-to-house solicitation. Extensive additions to our mains have been made, and our experience is that on an average street where a main is being put down we secure at the very least two out of every three houses for a domestic service. In some cases we have secured every single house and have put in the services at the same time as the mains have been laid. We control the gas stove business in our city and the stove usually goes in and is connected up at the same time that the main is laid. The extension thus starts to earn dividends from the day it is put down.

We do not find that so much progress has been made in the industrial branch as the domestic, possibly because we have not yet paid the same attention to that branch, and that ours is not a manufacturing city. Gas is used, however, in laundries for heating irons and mangles, and other laundry machinery, and in tailoring and other shops for like purposes, in newspaper plants for heating metals, both for typesetting and stereotyping, and in metal machine shops for brazing, etc.

The field for industrial gas is almost unlimited, however. In the melting, refining and amalgamating of metals, for welding, sharpening and casehardening of tools, forging, rivet heating, barrel and keg branding, tobacco drying, coffee roasting, candy making, soldering and other operations requiring a very high temperature, confined within a small space, gas stands pre-eminent for utility and economy.

As stated in the outset I have only attempted to put forth a few facts and suggestions on the uses to which gas can be conveniently and profitably put, in the hope that it will bring on a free and open discussion on the subject.

Discussion.

Mr. Coates—What system is adopted in Ottawa in putting in services?

Mr. Forbes—We run an absolutely free service right to the consumer's meter. We also install the meter with the service. We charge $2 a year for three or 5-light meters. There is very little lighting in Ottawa. It is an electric city.

Mr. Burnett—Do you charge the meter rent monthly?

Mr. Forbes—We render the meter rent with the gas bills, and we charge $2 a year, payable quarterly, for the prepayment meters as well. I believe 60 per cent. of our meters are of the prepayment type.

Mr. Coates—Do you have any kicks about payment?

Mr. Forbes—If they do we take the meter out.

Mr. Burnett—We have always found it difficult to get the rent for prepayment meters. Instead of giving 250 feet for a quarter, we give 240 feet, having 40 feet on the dollar towards the meter rent.

Mr. Forbes—We have twice the capital invested in prepayment meters that we have in the others. We set the prepayment meter back to $1.10, the same as the ordinary consumer; we put them all on the same basis.

Mr. Phillip—Do you use locks or seals on prepayment meters?

Mr. Norris—Locks exclusively.

Mr. Forbes—So do we.

Mr. Phillip—How do you find them work?

Mr. Norris—Out of 55,000 meters in Montreal 30,000 are prepayment. They seem to like them. We find people who could well afford to stand a gas account once a month ask for the prepayment meters.

Mr. Phillip—We lose practically no money on gas consumers. We felt we wanted to use prepayment meters in certain cases, but our ordinary population in Berlin does not seem to like the idea of paying for the gas before they get it.

Mr. Coates—If you introduced prepayment meters people would get to like them. We had the same feeling to contend with, but a little later they turned round and asked, and are still asking for them.

Mr. Forbes It has a tendency to reduce your complaints; you get very few complaints about the bills. A consumer in Ottawa who is a millionaire insists on having a prepayment meter. We charge $1.50 for making the change.

Mr. King—I was connected with a works in England for some time, where we found great difficulty in collecting meter rent. If you rendered meter rent accounts you could not get them; so we put the gas at a little higher price. They got less gas for their money, and we had some 3,000 meters in use in a population of 28,000 people.

Mr. Phillip—A wonder to me is they don't steal the meter—money and all—when they are moving.

Mr. Forbes—We don't have one case in a month where the cash box has been tampered with. Of course, we hold the consumer responsible for the cash that is put in the box.

Mr. Norris—We have comparatively very few kicks in Montreal; about one a day; or 30 a month. Respecting tampered boxes, they have to pay up in every case before they can get reconnection; for the damage as well.

Mr. Forbes—A condition in our forms is that they pay the meter rent quarterly. We render the meter rent bills quarterly for prepayment meters.

Mr. Norris—We charge $1 if the consumption does not attain $12 a year.

Mr. Forbes—We also have a minimum. We won't render a bill for less than 26 cents a month; we bill them 26 cents in any event. There is a fixed charge in connection with every consumer that you have got to carry no matter what the size of the consumption is. If one does not use 26 cents' worth in a month, we bill that much anyway.

Mr. King—When you put in automatic meters do you give them anything?

Mr. Forbes—No; we put on the outlet meter connection, they paying for everything else.

Mr. Coates—Our Company is controlled by the Ottawa Electric Company, which naturally wants the lighting, and I have lost all heart for the lighting business since I have been in Ottawa.

Mr. Carter—Out of $40,000 worth of business we don't lose $50. Where your bills are paid every quarter, would it be any advantage to put in prepayment meters?

Mr. Forbes—I would not advise it. The initial cost of a prepayment meter is twice the cost of an ordinary one. I am not in favor of prepayment meters at all if you can get out of using them. We only had a loss of ¼ of 1 per cent., so we feel pretty good over it.

The President—It does not make much difference at what price you sell gas, you have the same amount of kicking; we have been selling natural gas at 30 cents a 1,000 feet, which gas has 1,000 heat units, and we have just as many kicks as we had when we were selling $1.50 gas. We used to charge a meter rent of 15 cents a month, and they would ask, if their account exceeded 25 cents, to have their meter off. We had a number like that. No matter what your price is you will still have a number of unprofitable consumers. Once only we tried to eliminate this unprofitable consumer, so we advertised that on a certain date the minimum account would be $1. We were trying to educate the public up to the fact that it costs a certain fixed minimum charge for us to be ready to serve them. Even at this charge it figured out that they could have three fires a day and a hot plate. I showed them it was 3 cents a day, or 1 cent a fire; that at less they were a direct loss to us, and we would be better off without them. We had a beautiful scrap. They came in to us like the crowd that is in here now. They literally mobbed me. It was unfair, it was unjust, and I don't know what else. Finally I had to take back water. But I firmly believe that if there is one thing we want more than another it is that we should get the people educated up to the fact that it costs money to place ourselves in a position where we can give them service. I talked to the larger consumers, men who used 50,000 feet a month, and showed that they should get behind me in this. They did not get behind me, nor could I get them behind me. They said it was a ridiculously heavy charge. They wanted to pay the cost of the gas plus a reasonable profit and forget the cost of getting the gas to the consumer. How many of us can manage our distribution at a cost of 3 cents a 1,000 feet? Many of you will say you can't. I don't believe you can. If we are to make any advance in this business it has got to be by moving along the lines of increasing the volume of business. Can't we get out of the rut? Are we to go on in the same way that we have for so many years? I have been giving this thing much consideration, and feel that I want to talk to this Association and to all the members of the gas fraternity about it. Take the economy of gas for heating purposes. How much water will a pound of coal evaporate? It is a pound for 10 pounds, isn't it? There are 14,000 heat units in a pound of coal, and there are 1,000 in natural gas, and 5 feet of natural gas will evaporate a pound of water. They are selling it for 24 cents a 1,000. I believe we could capture two-thirds of the domestic heat business of this country by getting down to it along the lines I am now speaking of. I may be wrong but I think that that is the case. [Applause.]

Mr. Cunningham—The discussion on this question of the prepayment meter has brought to my mind a statement which was made by the Superintendent of the Gas Company at Holyoke, Mass. (Mr. W. H. Snow), and his conclusion was really remarkable to me. He claimed that, after a thorough examination of the accounts, he was satisfied the prepayment meter showed a closer collection by many per cent. than by the other or ordinary method. In other words, that the gas that was unpaid for owing to robberies and so on, was far less than the amount formerly charged off as uncollectable. It was new to me to see it figured out that way.

Mr. Burnett—It seems to me purely a matter of local sentiment. Is not the prepayment meter a great business getter if you can arrange it so that the money comes back through selling stoves on time.

Mr. Harris—Wilmington started selling stoves on this plan, and found that the prepayment meter would convert the consumer; they charge him $2 for gas until the stove is paid for, and collected it by means of the prepayment meter. They found it a source of revenue, in the sense that it has been a large business getter, bringing them customers for gas that they would not get and did not get by the ordinary method and selling the stoves as well, even if they did sell them on time.

Mr. Forbes—Fredericton, N. B., started in to install stoves. Their plan was to put the gas 50 cents a 1,000 higher than the regular rate.

A Voice—Yes, and they are out of business.

Mr. Harris—In this case they put the gas at $2 instead of $1, until the stove is paid for. Then the meter is put back to the proper rate.

Mr. Burnett—Yes, and the people used so little gas that the stove was worn out before it was paid for. In a conversation the other day with Mr. Keillor, it struck me his plan would be worth telling you. He is in a town where they have all the customers they can hope to get. They commenced putting in installations and charged for the gas at a higher rate; they had their capital all back in 3 years and doubled their consumption. To my mind that is the salvation of the gas business in small towns where the people are not willing to invest their money and put in an up-to-date outfit. They understand they are paying a little more, and they don't mind it. By the time you get your money back you have a customer for all time.

Mr. Carter—One difficulty that is to me a very serious part of the business is we have no difficulty in the centers of population in supplying them, but where you have to run 400 or 500 feet of pipe for one customer, whose returns for a stove, etc., for 2 months, amount to $10 (you have had to spend $300 to get there), the item of interest becomes a serious one. You have spent as much as would supply 12 or 14 people where the residences are close together.

Mr. Phillip—That applies to any town. It is better in the cities. Going along any street you will strike houses on lots 20 to 40 feet wide. In Toronto often 16 feet. Under such circumstances there is no trouble whatever in running a main, but the Dutchman up there, who doesn't live on a lot 100 feet wide, thinks he is not living at all. It means a big investment in mains. When they make application for gas we charge them a deposit of $4, which is refunded off the gas bill when the gas is used. We only run the service to the property line. If the service is run into the house at once we do not charge the $4; that is, if they are going to use the gas at once. If they want the service laid in there for the purpose of advertising the house for sale, then they have to put up the $4, but they get it back again when the gas is used. Regarding the prepayment meter as a getter of business, it would be a good proposition for us. The trouble with municipal ownership is that if one ratepayer in a town is entitled to gas they all are. I am no municipal ownership crank, but this difficulty has come up frequently in Berlin. A man comes and wants gas who is 400 to 500 feet off a main, so if he gets it somebody else has to put up the money to help give it to him.

Mr. Carter—Our people have a far better service than ever they had. I believe in public ownership and in treating all alike; and the king, if he were there, should not have the inside track. Every man was to be on the same footing; we have them at arm's length and all the city knows it is a good thing. If we had a weak manager it might be different; but I think we have proved that ours is a good business. We wrote off $130 in 18 months, and in that time we collected $39,500 net profit. Four years ago we made $79,000 net profit. We have just come down to $1 gas; we have reduced our debentures some $20,000 in 4 years. We have paid $100,000 in the construction of a new plant out of the earnings, and all the debentures we issued amount to $55,000. We shall get that down to about $10,000 this year.

On motion of Mr. Carter a vote of thanks was tendered to Mr. Forbes.

The President announced that the paper by Mr. R. A. Wallace, on

SOME EXPERIENCES WITH CANADIAN GAS COAL,

would, in the absence of the author, be read by the Secretary. It is as follows:

The subject of gas purification has been dealt with so frequently by numerous writers and speakers at various Association meetings that, when requested by the Secretary to prepare a paper, I was at a loss to know where to find material for the subject. To the members of the Canadian Gas Association, however, particularly those in the middle and western sections, a recital of experience with sulphurous coal may be of interest.

Prior to 1906 (when control of the Quebec Gas Company changed hands), the manufacture of gas had been carried on in a somewhat out-of-date works, which, while it may have served the purpose at the time, was not calculated to meet the demand of a growing business or secure the most economical results.

Canadian coal, the analysis of which showed the presence of a large percentage of sulphur, had been used almost entirely, the carbonizing being carried out in direct-fired benches at low heats, while lime alone had been employed for purification, in a set of 4 boxes 12 feet by 14 feet by 4 feet, controlled by a center valve permitting 3 boxes on and 1 off at all times. As far as I could ascertain, stopped standpipes or naphthaline obstructions were things unknown, but the preparation of the lime and the changing of the purifiers required a large amount of labor. The new owners having decided on the immediate installation of an up-to-date plant with much greater capacity, such repairs were made to the old apparatus as would enable us to get along with

an increasing output for a few months, it being expected that the completion of the new apparatus would put us in a more comfortable position for some time.

The sections of the new plant were designed to have a nominal capacity of 700,000 cubic feet per day, the purifiers, 4 in number, being 20 feet square and 5 deep, with 16-inch connections, and a valve system which permits 1, 2, 3 or 4 boxes to be used as desired, the boxes being arranged in series. The retort house section was completed first, and, with visions of higher yields and reduction of operating expenses, the regenerative benches were put into commission; then our troubles began.

With the higher heats in the new benches the quantity of sulphur compounds thrown forward increased to such an extent that, do what we would, the old purifiers would not take care of the gas passed. The quantity of lime on the grids was increased, changes were made in the mode of preparation, but all to no purpose; complaints from the consumers kept coming in. The first of the new boxes was rushed to completion, temporary connection being made to the outlet of the old purifiers, and the extra box charged with two 18-inch layers of fresh oxide of iron, but with little improvement. As the acetate of lead test paper showed clean gas at the outlet of the old boxes, every precaution was taken to make sure that no gas was by-passing the purifiers, and preparations made to have a second new box put into commission as quickly as possible.

In the meantime we were also having serious trouble in the retort house with stopped standpipes and pitch in the hydraulic mains, and difficulty in having the tar flow freely from the hydraulic mains to the tar well. As the tar main to the well was exposed for a short distance through an open shed and the outside temperature was ranging from 28° to 35° below zero, we had it covered with hair felt and a jet of steam turned in to keep the tar warmer, the hydraulic mains were cleaned out thoroughly and the heats in the benches reduced.

The second of the new purifiers was turned in, being charged with a 9-inch layer of lime and two 18-inch layers of oxide, and while there was a decided improvement the conditions were still unsatisfactory. As we had been changing the old boxes very frequently, and there had been no evidence of H_2S passing the purifiers, it occurred to me that the lime had not become sufficiently foul to arrest the carbon bisulphide, and the old boxes were allowed to remain unchanged for a longer period; but it was not until we had turned in the third of the new boxes, which was charged with two layers of lime and one of oxide, that the complaints from our consumers ceased. We now had a total of 6 boxes at work, 3 of the old ones, all charged with lime, the new boxes containing lime and oxide as already mentioned, the oxide being mixed with about 30 per cent. of planer chips to lighten it; and while the complaints from outside ceased with the introduction of the sixth box, the changes in the purifiers necessary to maintain this condition were too frequent.

Believing the trouble to be in the coal itself, we started using coal from another shed and made arrangements to have a sample of what we had been using tested in an experimental plant. With the change in the coal the conditions improved at once. The experimental test of the coal showed the following results:

Volatile matter	25.00	per cent.
Fixed carbon	69.00	"
Ash	4.40	"
Moisture	1.60	"
	100.00	"

An analysis of the crude gas resulted in showing the presence of 11 per cent. of CO_2; 1,640 grains of H_2S in 100 cubic feet; 75 grains of CS_2 in 100 cubic feet.

A test of the oxide which had been in use in the boxes up to this time indicated 12 per cent. of free sulphur.

Our experience has demonstrated that, under certain conditions, the purification of gas from coal containing such large quantities of sulphur will be a most difficult and expensive operation, and to maintain a satisfactory relation between maximum yield and minimum cost we must be satisfied with results per ton, or make per bench, much below what is usually obtained from coals mined in other localities. With higher heats, such as are in everyday practice, employed to carbonize Pennsylvania and some other coals, the sulphur compounds other than H_2S would be so much in excess from Nova Scotia coal as to make ordinary methods of purification expensive or unsatisfactory, while to attempt to purify the gas with oxide alone would be useless. If the coal is stored outside and allowed to become wet, the amount of CO_2 in the crude gas will be very much increased and necessitate a greater quantity of lime, and more frequent changes in the purifiers to secure satisfactory service and freedom from complaints. We have since decided that wet coal was the principal cause of our first trouble, the CO_2 evidently passing into the second and third boxes and driving forward the sulphur which had already been absorbed, an immediate improvement having followed the change to dry coal.

The best conditions are secured by maintaining a moderate heat in the benches, by taking precautions to keep the coal dry, and by maintaining such a seal on the dip pipes as will insure against drawing in air without throwing an excess of back pressure on the retorts. The admission of atmospheric air will not only upset the purification in the carbonate and sulphide boxes by driving forward the sulphur compounds, but will also set up partial revivification in the oxide of iron, and bring about such an increase of temperature within the purifier as will set up a very considerable element of danger from fire the instant the cover is raised for the purpose of removing the fouled material.

The usual lead paper test applied near the outlet of the boxes is no indication that the gas is passing into the holders clean, as the impurities other than H_2S will be carried forward while the lead paper indicates a clean box, and will manifest their presence very quickly where gas is being consumed. To secure freedom from complaints care must be taken to arrest the CO_2 in the first lime box, at the outlet of which tests should be applied to determine whether or not carbonic acid is passing in any quantity into the box for the arrest of CS_2. The Orsat apparatus is a satisfactory instrument for making this test.

In the period referred to in this paper the results were:

Coal carbonized	1,784 short tons.
Gas made	14,898,000 cubic feet.
Lime used	80,000 pounds.
Number of boxes changed	12
Gas made between changes	1,241,500 cubic feet.
Oxide in use	40 tons, exposed 3 times.
Average yield per pound of coal	4.173 cubic feet.
Lime used per 1,000 feet of gas	5.38 pounds.

The lime was of good quality, containing 83.65 CaO. The oxide was obtained at Three Rivers, the analysis submitted by the firm supplying same showing 60 per cent Fe_2O_3.

Where the use of lime and oxide is imperative, it is advisable to have separate purifiers for each, as the different materials do not become foul at the same time; this necessitates increased labor costs in the removal of material which in a separate purifier would have acted on a much greater quantity of gas. At least 6 boxes should be in use where combination purification is carried on.

I might add that at no time during the trouble with the purification did we have any difficulty in maintaining a high candle power, the average for the period being 18.39, without any enricher.

[There was no discussion on the paper.]

The Association next listened to the paper by Mr. E. J. Philip, of Berlin, Ont., on

PRODUCER GAS FOR POWER PURPOSES.

At the executive meeting, where arrangements were made for the annual meeting, I understood that enough papers were provided to occupy the limited time at our disposal, and consequently did not do anything in the way of preparing one until the Secretary wrote me, giving a programme with my name down for a paper on "Producer Gas for Power Purposes." This title warranted a paper that would take up the entire time of the convention, but as you are all more or less familiar with the subject I will only touch on it in as brief a way as possible, and incidentally show that producer gas is not a strong competitor of the illuminating gas companies.

It has been an established fact for many years that a low grade gas would work in the gas engine and produce power, but the history of troubles from that time up-to-date would fill a book. It took many years to develop the producer and gas engine so that they would work in combination astisfactorily. The earlier types of engines were anything but satisfactory when operated on producer gas from the earliest types of producers, but as time went on about 10 or 12 years ago fairly satisfactory producer gas plants were installed, principally in Europe, in the earlier years. But what one man can make another man can duplicate, so that to-day you can buy from a great number of makers satisfactory apparatus.

The three general methods of making gas for any purpose are as follows: The heating of any carbonaceous substance in a closed retort gives off gases, and when these gases are collected and cleaned they may be used for light and power. Another method is to blow

up a bed of fuel to incandescence then shut off the air blast and blow steam through the incandescent bed. Gases will be given off during the second process, the steaming and blowing period being intermittent. This is the well-known water gas.

In the third system steam and air are admitted continuously to the generator, and gases that are combustible are given off, namely, CO_2 and H. These gases are mixed with others that are useless for power purposes, and reduce the B.T.U. per cubic foot to a point far below the heat units of illuminating gas; but yet the gas is very useful for power purposes. This is what is known as producer gas. In this system the amount of air and steam must be regulated so as to keep the fuel bed at a temperature high enough to produce the best results and yet keep down the percentage of CO_2 to the smallest possible point and the CO as high as possible. The H in producer gas is only useful in that it assists in making an explosive mixture. The really useful constituent of the gas is the CO. Producer gas of so low a quality that it will not burn when issuing into the air through a ¼ opening will still run a gas engine; it may burn if a torch is held to it, and will continue to burn as long as the heat of the torch is applied; but as soon as the cold envelope of air reaches the jet it will go out. Producer gas of good quality with sufficient H to keep up the temperature at the jet will burn with a pale blue or orange flame that is transparent and gives practically no light. It is a source of wonder to the world the power that can be obtained from gas of so lean a quality that it will not maintain combustion at a jet issuing from a portion of the system.

Gas engines operate on gas made in any of the ways mentioned and also natural gas. Natural gas is the ideal fuel for use in gas engines, as it is clean, high-powered and uniform at low cost; it is the cheapest fuel for the purpose. Illuminating gas, such as coal gas, is also an excellent fuel for gas engines, and when it can be obtained at reasonable cost will compare favorably with any means of making power in small quantities, being clean, medium high-powered and uniform. It eliminates some of the disadvantages of producer gas. Producer gas on account of its low cost of production is an economical way of making power, especially in engines from 40-horse power up. The disadvantages of producer gas are its varying quality and its very large volume, also its very poisonous nature.

Its varying qualities entail extra attention at the engines over illuminating or natural gas. Its large volume, compared with its power, necessitates a larger engine to do the same work, increasing the first cost of the engine, and its poisonous nature makes it unpleasant to work with, and also increases the accident liability of the company. This objection applies more especially to the pressure system. I might state here that producer gas is usually made either by what is known as the pressure system, or the suction system with a combination of both types.

In the earlier types the gas was made under pressure, a steam jet blower being used to produce the blast, and this is the general type of the large plants. In 1895 a Frenchman named Renier made an engine draw its own supply of gas from a Dowson producer without the aid of a blower or intervention of a holder. This was the first type of suction gas producer that operated an engine. It had many faults, but the idea was all right, and the present type of suction producer is similar in many ways. The suction type is used almost exclusively for small units, and is used successfully in sizes up to 250-horse power, but one this size, or where there are a number of engines to operate from one producer, the present type is better.

In the combination type, or what is know as the automatic producer, the gas is made under pressure without a holder between the producer and the engine, and if the blast fails from any cause the producer can operate as a suction plant. There are not many of these in use, but some successful plants are operated. It would take up too much time to describe each system, the points of difference and the various details of the many different types.

The point that interests the illuminating gas companies is what competition can they experience from producer gas. Let us analyze the matter a little. In any reasonable gas works that has not got beyond its capacity each extra 1,000 feet made with the same plant costs very little. Now if a customer who, we will say for the sake of argument, is using a gas engine, talks of putting in a producer gas plant, he has first to procure additional apparatus. It will take extra labor to operate it, even if it is small. He has the trouble of getting in coal and getting out ashes; he has an extra fire risk; he has an extra explosion risk, and extra accident liability; all points that cost money, or are liable to cost something any time. Now with the gas engine on illuminating gas, he has small capital outlay, his fuel supply is always ready, no waiting in the morning to clean the producer or get the gas of proper quality; the quality is always right if he gets it from the gas company. When he shuts down at night there is no fire in connection with the plant, the gas is so uniform that you can always start on time. If you are forced to start up for any reason your fuel supply is always ready and waiting. The point of difference comes in when you get to economy. The producer will make cheap power, but even if it makes cheaper power let the gas companies make a special rate for gas engines, and with a low rate for gas and the other troubles and expense eliminated the average manufacturer will be better off to operate illuminating gas up to 40-horse power. Above that they can make the power cheaper. The ordinary gas companies don't want the large gas engine on the line, as it is liable disturb the pressure in the mains unless they are very ample. It is up to the gas manufacturer to put his price down and work up arguments in favor of his gas in preference to producer gas for small sizes.

Discussion.

Mr. Philip—A number of people figured with me on producer gas plants. I have invariably been able to convince them that motors were a cheaper proposition and that illuminating gas was cheaper still, for the less stuff a small manufacturer has round his place, that he has to have help to look after, the better. There is very little trouble with the small gas engine; it eliminates labor cost. Any ordinary person can start it up and it will run throughout the day. Producer gas is a great proposition for making power in large quantities; but for the ordinary small factory, such as we have in Berlin, any saving in cost is more than offset by the increased amount of trouble and the additional capital involved.

Mr. Carter—What is the average cost per horse power, up to say 250, by producer gas.

Mr. Philip—Manufacturers will undertake to develop 1-horse power per hour per pound of coal. I may say, for the information of the illuminating gas men, that one item never heard about in connection with producer gas is the oil. I know one plant where the oil bill is $175 a month. I have had an opportunity of investigating a good many different plants and it is the same story; the oil bill is always high. As far as oil is concerned you can run a gas engine on pretty near anything, and some of you may have gas engines running your plant. The really important qualities of gas engine oil are that it should be sufficiently heavy to properly lubricate the bore of the cylinder, and at the same time have a low fire test. I want an oil with a low fire test, one that will burn and pass out with the gases. A high fire test oil does not burn properly in the cylinder and forms carbon. Here is another point. A man will say to you, "This is a 200-horse power engine," in which statement, of course, he is taking the rating of his engine; whereas, as a matter of fact, the engine may not be doing and may not be called upon to do more than half that much work. As a matter of fact a gas engine is a most wasteful thing on light loads. The ordinary standard guarantee in heat units is 12,000 B.T.U. at full load, 18,000 B.T.U. at half load, and 38,000 at quarter load. Generally you will find a guarantee that will specify 12,000 B.T.U. at full load. This won't apply, of course, to half loads, and still less to quarter loads, and is only one of the many things necessary for you to know before you can rightly understand just what you are getting in these guarantees.

[On motion of Mr. Forbes a vote of thanks passed to Mr. Philip was carried with applause.]

SPEECH BY MR. HAY.

Mr. Hay—I want to say a few words before the close of this meeting for I am not going to be able to be with you all day to-morrow. I want to thank you again for electing me to this high and honorable position of President, for this Association represents over 50 million dollars invested in this industry in this country. I feel that the head of this institution should be a practical gas man; that is my weakness. I do not see in what way it is going to be possible for me to make up for that lack, but I can say to you that I am willing to render to you the very best service that I can. I want to make an appeal that during this next year we will be all lifters and not knockers. If the efforts of your executive, with the present speaker at its head, do not come up to your expectations, make sure that you have done your part outside. No executive you can elect can do all the work in connection with this Association, and I am sure we will get honest support from everyone of this body of men that are here to-day. I have already referred to my incapacity as a practical gas man, but I am glad that I am supported by executives that are. If I

am anything I am a business man, and am nothing beyond that at all. I hope I will succeed in this.

A Voice—You will.

Mr. Hay—I would like to ask the executive of this Association to meet in this room here at 9 o'clock. I think it is important while we are all here, for we want to do some things and get some things set in motion. We want to organize and get some committees appointed that seem to me to be necessary and very important. [Applause.]

Next Place of Meeting.

After some discussion Montreal was chosen as the next place of meeting.

Speech by Mr. Cunningham.

Mr. T. J. Cunningham, of New York, having been called upon to address the meeting, narrated at some length the progress that was being made in the States and in Canada in the gas industry, despite the business depression of the past year, and referred to the works being constructed by the Consolidated Gas Company at Astoria, Long Island, etc.

Mr. Hay in the Chair.

Mr. Hay—I think we can spend a few minutes now very profitably in renewing memberships in this Association. I think it is our duty while we are here to put our names down, and if we have not got the funds, the Secretary will take good care to pass a sight draft on to us.

Mr. Pearson—The new President is already proving that he is a business man. [Laughter.]

The Secretary called the roll and noted names of renewals.

Mr. Hay—I want to say a word on behalf of our Canadian "Gas Journal." This Journal cannot be continued unless we support it. I think we ought, as members of this Association, give it our active support. I also think it would be well to have the minutes of this meeting published and sent to each member of the Association.

Votes of Thanks.

Mr. Pearson—I have much pleasure in moving a vote of thanks to the retiring President of this Association. He has been most active, has taken a deep interest in this work, and has really been one of the chief originators in forming it. I am sure you will all agree with me in this.

Mr. Philip—I have much pleasure in seconding that motion.

Mr. Hay—I heartily agree. I realize perhaps that is all that we are able to give him. It is a little cheap; for he has certainly given us efficient and valuable service. Owing to his extreme modesty I won't allow him to put this resolution.

[Mr. Hay declared the resolution carried amid applause.]

Mr. Powell—I think perhaps you have heard from me too often already, but I assure you I am very glad indeed of your kind words. I sincerely desired to accomplish something. I gave the meeting the very best attention I possibly could and will continue to do so. I appreciate very highly the kindly sentiments to which you have just given expression. Whether I was worthy of it or not, you put me there and I consider to be a king of experts, such as you are, a very high honor indeed. [Applause.] Now, I have very much pleasure indeed in welcoming Mr. Hay to the President's chair.

President-elect Hay took the chair, and after a short discussion it was agreed, on the suggestion of Mr. Pearson, to meet at 8 P.M. for a trip to Scarboro Beach, and the meeting was declared adjourned.

A New System of Tapping Mains Under Pressure.

The Gas World, recently to hand, contains the following description of an ingenious method of accomplishing the work named in the heading, as described by "J. T. T.," engineer in charge of the Norwich (England) Water Works Company:

This original system of fixing branches to pressure mains appears to be a labor saving method of value. Considerable ingenuity has, of late years, been exercised by engineers and others in devising and constructing apparatus whereby branches may be connected to pressure mains without its being necessary to shut the pressure off. The reason for the demand for such an apparatus appears to lie chiefly in the direction of economy of time and labor, and where water works companies have thousands of such branches to attach in a single year, a simple contrivance for the purpose named, whereby labor may be reduced to a minimum, must be of considerable value.

It is obvious that there is a demand for such an appliance in every country where water pressure is used; but in cities and large towns, where the shutting off the pressure may cause great inconvenience and loss to consumers, its application is absolutely necessary. Generally, the machines used for the purpose are costly and cumbersome and require several men to handle them, and it has been the object of the writer to devise a simple method.

An occasion arose for such an appliance to be of great service to the writer, when it was necessary to attach an inch branch to a high pressure steam main while steam was on. The arrangement shown was put through promptly, and attached to the main in the manner illustrated, without the least trouble or leakage of steam—the whole of the apparatus, of course, being left attached to the main. But though the whole appliance was left on the main, it was very inexpensive, and the cost was only a very small amount, compared with the gain of being able to apply the branch without shutting off the pressure. Moreover, the actual time necessary to attach it and get steam through was under half-an-hour and only one man on the job.

The essential feature of the design is—I make the branch pipe a means of drilling the hole in the main—steam (or water or gas) is prevented from leaking during the operation; the drill, which is attached to the branch, is left there.

Referring to the illustrations, *A* is the pressure main (of any size); *B* is the branch (of any size); *C* is the drill, a piece of flat steel, simply fixed in end of branch; *D* is a saddle casting, with insertion joint between it and the main (this saddle strengthens the main, which would otherwise be weakened by hole through it); *E* is a U-bolt, one or two being used according to size of branch being applied; *F* is a gland nut and *G* a lead joint washer. On the end of branch, beyond *H*, the usual steam valve is screwed and to its hexagon end an ordinary spanner is applied to rotate the drill.

Method of Using the Appliance.—Decide upon the position of the branch in relation to the steam main, and attach the saddle casting with all details (including the stop valve) attached. Rotate the drill by means of the spanner and stop valve until the drill has pierced the main. Pull down the gland nut, the collar *I*, entering the recess *J*, and lead washer, making a sound joint over all, thus preventing any possible leakage. The fixing of the branch is then complete, and, the stop valve being attached, further extensions of the branch may be carried out at convenience.

The illustration shows the bottom end of an actual ferrule, which

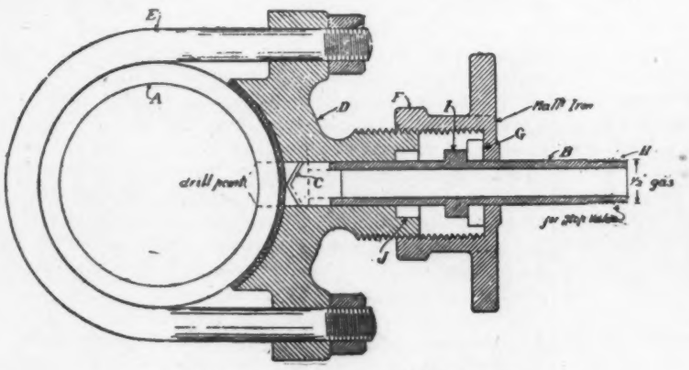


Fig. 1.—Device for Tapping Mains Under Pressure.

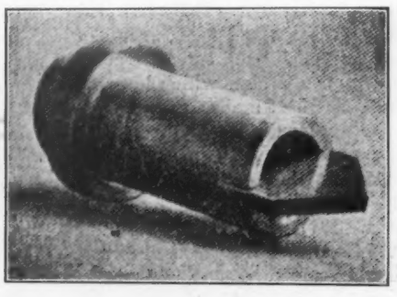


Fig. 2.—Showing Drill Mounted for Use.

will make clear the manner in which I fix the drill. The thickness of the drill obstructs the flow of steam, gas, water, etc., but that is of no consequence, as it only means that a sufficiently large ferrule must be used for a certain supply of steam, gas or water required.

The method I adopted myself was exactly as depicted in the sketch, and was designed, pattern made, moulded and castings made off, and the fitting all finished inside one day. I have no access to one now, or I would send a photograph for reproduction.

I might say I applied one as a test for speed of fixing to a 4-inch water main in Norwich some years ago, in the presence of a former assistant engineer of the city of Norwich Water Works Company. The affair was brought under the notice of Sir John Hawkshaw, who promised to see it, but before he had an opportunity to do so he, unfortunately, died. Since then, I have let the matter lie in abeyance.

I am aware that this design is rather original and apparently "far-fetched," but I must confess I believe there is something good about it. I am aware, too, that in introducing appliances that are distinctly original, one has to combat the prejudices of the "clique," and I am aware also that that is no little obstruction.

That this appliance of mine is suitable and useful for making branch connections goes without saying; it is simplicity itself. The saddle and "U" bolts also strengthen pipe at the spot that would otherwise be weakened by drilling the main, a most important point under heavy pressure.

Hand Bending Tools.

These two hand bending tools, made by Messrs. Estep & Dolan, are designed to meet the miscellaneous requirements of small shops and

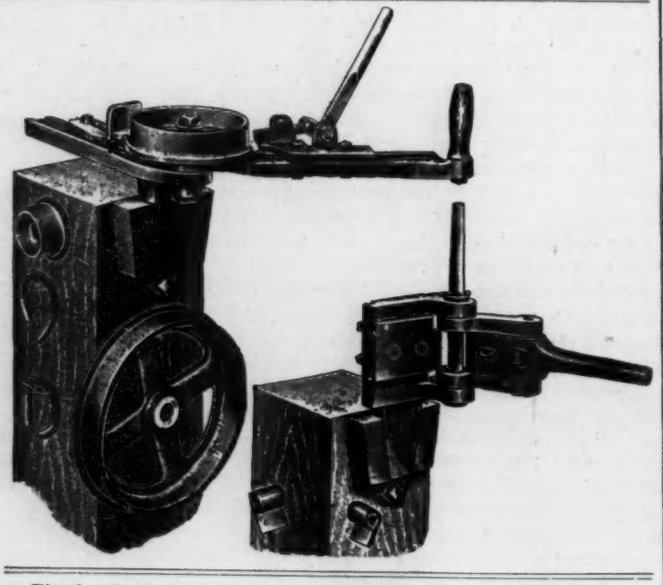


Fig. 1.—Ring Bender No. 1. Fig. 2.—Hinge Bender No. 1.

factories where the character of service required does not justify the use of expensive power machines. The No. 1 ring bender, Fig. 1, is suited to such work as the bending of rings for hub bands, wheelbarrow tires, chain links, etc., and has a capacity for forming bands up to 20 inches in diameter. It is of very simple construction, being composed of a central wheel form, around which the shapes are bent by means of a pivoted hand lever. Upon the latter is mounted an adjustable clamping device, which locks the piece against the form. Sizes of forms up to 10 inches vary by graduations of ¼ inch, and above this size by even inches up to 20 inches; forms from 1¼ inches in height and up can be supplied. For the bending of U shapes forms are also furnished when required. Fig. 2 represents the No. 1 hinge bender, which is referred to as being the only tool of this character on the market. It is adapted to the forming of heavy hinges and flat eyes without offsets, such as are used on barn doors, gates, etc. One pin and bushing are furnished with each machine, but others are supplied on order. It is adjustable only to a limited extent, though special sizes are built for specific work. Both tools can be interchangeably mounted on the same block.

A French View of Vertical Retorts.

The *Journal of Gas Lighting* thus epitomizes some remarks on vertical retorts made by M. Sainte-Claire Deville, at the last meeting of the French Association of Gas Engineers:

A rather thick mass of coal undergoing distillation, whether in vertical or horizontal retorts or in chamber furnaces, is composed of three parts: (1) A central core of uncarbonized coal, which the heat has not reached; (2) an outer crust of coke; and (3) an intermediate zone in active distillation from which issues the gas. The question that arises is this: Does the gas escape from the intermediate zone and traverse the fissures of the outer crust of coke, or does it pass into the interior and make itself a passage between the fragments of coal which are still comparatively cool? It is scarcely admissible that the resistances opposed to the passage of the gas by the coke and the coal should be strictly equal; and it is very probable that, one of these resistances being very much greater than the other, almost the whole of the gas issues either by the first or the second of the two ways indicated above. In Germany the leading advocates of vertical retorts and chamber furnaces declare that the gas returns and passes through the coal; but M. Deville does not believe that all the German gas engineers who use vertical retorts agree with them. Notwithstanding his great admiration for the excellent work done by Dr. Bueb and Mr. Körting, M. Deville cannot bring himself to share their opinion in this respect; and he set forth, in a few words, the reasons which led him to come to the conclusion that the gas goes through the coke and escapes along the walls of the retort.

In the first place, there is the question of pressures. It is well known that the pressure of the gas in the lower portions of a vertical retort charged with unscreened coal, though very high at first, decreases proportionately as carbonization progresses—in other words, the section of the coal passage decreases while that of the coke passage increases. The conclusion to be drawn is that the gas passes more easily through the cracked and fissured pieces of coke than through the thick mass of coal. Secondly, if the gas, in liberating itself, does not come in contact with the sides of the retort, how can the presence of graphite there be explained? When, at the end of the period of distillation, steam is introduced into the retort, it is relied upon to a certain extent to produce water gas with this graphite and reduce its quantity. So that the steam makes its way by preference along the walls of the retort. Besides, when the coke is examined after drawing, the surface in contact with the retort appears mammillated and fissured—identically the same as in the case of the coke which comes in contact with the floor of a horizontal retort.

The principal argument in favor of the central passage is the absence of naphthaline in the gas and the tar, and particularly the small proportion of lampblack in the latter. M. Deville said he appreciated the value of this argument. At the same time he remarked, with regard to naphthaline, that its absence from the gas could be explained as he had shown when speaking on the subject of condensation. With reference to its absence from the tar, it seemed to him that this requires to be confirmed much more decisively than has been done up to now. As to the considerable reduction in the quantity of lampblack in the tar, he thought the testimony which had been furnished on this matter did not leave room for doubt. He acknowledged this the more willingly because the same phenomenon is observed, though in a rather less degree, when coal is carbonized in thick layers, and *à fortiori* in fully charged horizontal retorts. Before the results furnished in this connection by vertical retorts were made known, it had, he said, been noticed in Paris, and especially at the experimental gas works at La Villette, that, with ordinary retorts, the heavier the charge of coal the more fluid and poor in fixed carbon was the tar. M. Deville explained this in the following way: In the case of a thick layer of coal, a notable proportion of the gas has still to be produced when there has already been formed round the central mass a crust of coke which has attained a red heat. It is in forcing themselves through the fissures of the coke that the volatile products are subject to the decomposing action of the high temperature, and the carbon resulting from this decomposition is immediately deposited in the pores of the coke, which is thereby rendered more dense than usual and has imparted to it the appearance of metallurgical coke. The gas is, in a sense, filtered.

To sum up, M. Deville said he believed that the illuminating and calorific power of the gas and the yield of tar necessarily diminish in proportion as the thickness of the layer of coal undergoing carbonization increases, whatever may be the shape and inclination of the re-

ceptacle in which the operation is going on; and that, on the other hand, the quality of the tar improves. The extent of empty space with hot walls which the gas has to traverse before it leaves the retort also plays a part, but it is a secondary one; and the record of the amount of light produced per 100 kilos. of coal continues to belong to the 3-meter (10 feet) horizontal retort, carbonizing in 4 hours a thin layer of coal weighing at most 330 pounds. But during the past 15 years the importance attached to illuminating power has gradually decreased, while the necessity for reducing and simplifying manual labor has become more and more pressing. If the relative interest that is presented by these two points of view had 15 years ago been what it is to-day, M. Coze would most certainly have given to gas managers a very inclined retort working with a full charge of coal, or possibly the vertical retort itself, or even the Munich carbonizing chamber. At that time, however, these solutions were not ripe.

In conclusion, M. Deville said he would make one remark specially applicable to the vertical retort. The absolute necessity had been recognized of charging into it, but from two separate hoppers, small coal on one side and nuts on the other. There might possibly result from this practice two difficulties, the importance of which he did not wish to exaggerate, but which should nevertheless be pointed out. In the first place, the diaphragm separating the two classes of coal must be difficult to regulate so that one kind should never be in excess. It seemed, at first sight, that nuts would frequently be wanting. Secondly, in the greater part of the coals – of course, there were exceptions the large pieces were much purer than the small coal. The result was that the mass of coke was very often composed of two parallel vertical columns, the quantity of ash in which would vary considerably. There was consequently an absence of homogeneity in the coke.

Determining the Electromotive Force of a Dynamo Without Running It.[1]

By Mr. W. M. Hollis.

Sometimes it may be desired to obtain the electromotive force of a certain dynamo and for some reason the means for driving it may not be at hand. Given the speed in revolutions per minute and a spring balance or, for a large machine, some form of a portable platform scales, the e.m.f. may be readily obtained. Some preliminary adjustments will doubtless have to be made in order to obtain convenient values of current for the spring balance or scales, and also to obtain a convenient length of lever arm.

First of all the direction of rotation of the machines should be found when connected to run as a motor. The field coils should be fed by a circuit separate from the armature and an ammeter placed in the armature circuit. A somewhat approximate idea of the full-load armature current for the machine may be obtained by inspection and a resistance capable of carrying current for some length of time without overheating should be inserted in the armature circuit.

The current used for the test may be the full-load current or only a fraction of it, and the series armature resistance should be of a value to keep the current at such value. This resistance should also be adjustable within wide limits. A variable field resistance of known value should be employed or an ammeter should be placed in the separate field circuit so that the field current may be kept constant. The method involves the principle used in the well known Prony brake test for obtaining the horse power of a motor.

Some form of lever arm of suitable material, depending upon the size and position of the generator, should be firmly clamped or fastened to the pulley at one end of the shaft or in any other convenient manner if a pulley is not at hand. The lever may be attached to the outer edges of the pulley rim like a crank arm and the spring balance fastened to a crossbar with its lower or measuring end fastened to the lever arm or crank arm so as to prevent the rotation of the shaft and to measure in pounds the pull of the lever arm. The size and strength of the lever, of course, depends entirely upon the size of the machine, though a piece of timber is preferable ordinarily.

When the adjustments are made to give convenient values of the armature current and the distance of the point of attachment of the spring balance on the lever arm from the center of the armature shaft is measured accurately in feet, the values may be substituted in the equation—

$$E = (l\ S\ P) \div (7.04\ I),$$

where l is the distance in feet from the center of shaft on the lever arm to the point of attachment of the spring balance; S, the revolutions per minute of the armature at normal full load; P, pull in pounds on the spring balance, and I, the current in the armature at the time. The field current should be be kept constant all the time. Of course, the direction of rotation of the machine when the current is switched on should be determined before the balance or scales are put in place, otherwise if the direction of rotation is wrong some damage may be done due to the whirling of the lever arm free in the wrong direction.

As is well known, with the Prony brake method of using a lever arm and spring balance or scales, the horse power may be readily determined by the equation—

$$Hp = (2\pi\ l\ S\ P) \div 33{,}000,$$

where $l\ S\ P$ have the same significance as before. With no losses in the machine—

$$Hp = \frac{E1}{746} = \frac{2\pi\ l\ S\ P}{33{,}000} \text{ and } E = \frac{l\ S\ P}{7.04\ I}$$

The current in the field coils is not included in the test, and the current used in the armature should be as small as will give scale readings which may be read with some degree of accuracy. However, the armature current necessary to give good results should be the full load current.

Care should be used to have the bearings as well lubricated as possible in order that the armature may move freely. While readings are being taken on the spring balance the lever arm should be moved slightly, after an apparent balance is obtained, to increase the balance reading, and the balance should then return quite easily and quickly to its original reading. The freer the movement of the armature the better the results obtained.

Usually a good plan is to oscillate the armature by means of the lever arm slightly in each direction before the current is switched on, in order to be sure that there is a free movement of the same.

The balance reading (if any) when no current is flowing should be taken by oscillating the lever arm slightly by hand, the mean reading taken and this value in pounds subtracted from the value when a pull is exerted with current flowing in the armature. If appreciable this pull is, of course, due to the unbalanced end of the lever arm weighing down the scale.

Now, the losses in a dynamo are the I^2R losses in the armature and the field coils, the friction losses and the core losses. The field coils are excited from a branch circuit not included in the test, which eliminates their I^2R loss. The armature is stationary, which eliminates the friction and the iron losses. If a large current valve is used in the test, the losses may be calculated and allowed for as a certain percentage of the full load power of the machine. With all losses, say 15 per cent. or with 85 per cent. efficiency,

$$E = \left(\frac{l\ S\ P}{7.04\ I}\right) 1.15$$

Very likely several trial values with the corresponding calculations compared, or a method of cut and try, will have to be used unless the values of voltage and current are approximately known at first. In this case, however, the friction losses, the iron losses and the field coil I^2R losses are eliminated and the armature I^2R loss is usually only a small percentage of the whole loss.

1. *Elec. World.*

Bureau of Information, The American Gas Institute.

Bureau of Information,
The American Gas Institute,
Headquarters, 716 Locust Street, St. Louis, Mo.
W. A. Baehr, Chairman.

Answer to Prior Question.

Question No. 21.—"Under ordinary conditions of low pressure distribution, what drop in gross B.T.U. per cubic foot would you expect per mile from works holder, when making water gas only, and during the winter season with the atmosphere at an average temperature of about 32° F.? What, when making one-half coal gas and one-half water gas? What, when making one-third coal gas and two-thirds water gas?"

Answer by the Bureau of Information.—Any gas containing illuminating vapors will experience a continuous condensation and precipitation of these vapors, with consequent drop in candle power and heating power, as the temperature of the gas is gradually lowered after leaving the generating apparatus. This loss of vapors, candle power and heating power, is dependent almost entirely upon the temperature to which the gas is cooled. The extent to which gas will lose candle power and heating power after leaving the holder and in passing through street mains is, therefore, almost entirely dependent upon the difference between the temperature of the gas in the holder and its temperature in the street mains. Consequently, if a test of the heating power of the gas has been made at the works say, at the holder outlet, then to predict what, if any, will be the fall in the heating power in passing through the mains, it is necessary, first, to know to what temperature the gas has been cooled in the holder; in some extreme cases the holder temperature may be even lower than that of the street mains, and in such a case, the gas should show just as high a heating power when delivered to the consumer as it shows by test at holder outlet. The most satisfactory reply to the question, taking the general case of a gas freshly delivered from the generating apparatus, and experiencing thereafter a continuous fall in temperature, is, therefore, to state what loss in heating power is experienced when the gas is cooled from an ordinary high works or holder temperature to the lowest temperature of street mains ordinarily experienced in northern climates. Each observer who may make the test of the heating power of his gas at the works will have to ascertain to how low a temperature his gas has been cooled at the works or holder before its heating power was thus determined, and having ascertained this temperature he can, from the figures given hereafter, ascertain at least approximately how much further loss there will be in transmission of gas through the mains at whatever temperature exists in them at the time. For complete information as to the condensation of vapors from gas, and methods of ascertaining by the use of the hygrometer the temperature to which a gas has been cooled, see a paper, by Mr. W. H. Gartley, "Proceedings American Gas Institute, 1906." The question inquires as to the loss in B.T.U. per cubic foot "per mile from works holder." From the foregoing, however, the gas will arrive at a permanent heating power just as soon as, or very quickly after, it has reached the temperature of the street mains, and this will probably occur within a very much less distance than 1 mile from the works if the gas travels at any ordinary low speed.

The actual number of B.T.U.'s lost in cooling a gas through a given number of degrees will necessarily vary, according to the kind and quantity of vapor illuminants in the gas; to give figures covering a large range of kinds and candle powers of gases, therefore, would demand a large number of experiments, covering which up to the present time there does not appear to be any data. The following experiments, which were made with care, will, however, give a good indication of losses for the qualities of gas ordinarily distributed. Note that the two experiments on carburetted water gas indicate the loss in B.T.U. per 1° to be somewhat greater at high temperature than at low, which was to be expected. Candle powers are by flat flame:

	Temperature.	Heating Power.	Candle Power.	Loss B.T.U. Per 1° F. Cooling.
Carburetted water gas, Initial	78° F.	653 B.T.U.	24.4	....
" " " Final	43° F.	614 "	....	1.11
" " " Initial	59° F.	674 "	24.8	....
" " " Final	37° F.	653 "	....	0.96
Coal gas, Initial	65° F.	573 "	12.3	....
" " Final	37° F.	557 "	....	0.60

From the foregoing, it seems reasonable to expect that, in cooling from ordinary works temperatures to winter street main temperatures, there will be a loss per 1° F. of about 1 B.T.U. from carburetted water gas of about 24-candle power, and of about .6 of a B.T.U. from 12 to 13-candle power coal gas. It also seems a reasonably rough estimate that gases of initial candle power intermediate between the foregoing 12 to 13 and 24, would be intermediate and proportional between the .6 B.T.U. and the 1 B.T.U. per 1° F. Thus, a mixed gas of 18-candle power would probably experience a loss of somewhere about .8 B. T. U. per 1° F.

Additional Question.

Question No. 35.—"What specifications should be inserted in a long term contract for gas oil?"

Items of Interest
From Various Localities.

Mr. E. N. Myers has resigned his position as Manager of the Petoskey and Bay Shore Gas Company, of Petoskey, Mich.

The Pennsylvania Company for Insurance on Lives and Granting Annuities, 517 Chestnut street, Philadelphia, announces that it will pay, on and after September 1st, at 105 and interest, bonds Nos. 142 and 755, of the Savannah (Ga.) Gas Company's first mortgage, 5 per cent. gold bonds, which were drawn for payment, according to the terms of the mortgage, on July 1st.

Here is another example of the soulless gas corporation. Mankato, Minn., has been suffering sorely through and by an epidemic of typhoid fever. To add to the discomfort of the patients the weather temperature was very high during the worst of the fever outbreak. To lend a helping effort, Mr. R. E. Brown, General Manager of the Mankato Gas and Electric Light Company, caused the following notice to be published throughout the city: "The Mankato Gas and Electric Company will gladly install an electric fan for anyone who is seriously sick during the present epidemic, without any charge at all, providing the party is within reach of our current, Advise us through your attending physician."

A largely attended meeting of the shareholders in the Peoples Light, Heat and Power Company, of Springfield, O., was held in the Neil House, Columbus, O., the afternoon of July 31st, for the purpose of discussing plans for the reorganization of the Company under the plan submitted by Mr. W. H. Sharp. The sentiment expressed largely favored that method which provides for amalgamation with the Home Heating and Lighting Company.

The capital stock of the Cincinnati Gas, Coke, Coal and Mining Company, which is a subsidiary concern controlled by the Cincinnati Gas and Electric Company, has been increased to $1,000,000, which means that the Company is about to exercise an option held by it on certain coal lands in West Virginia.

The Des Moines (Ia.) Gas Company has subscribed $1,000 towards the stock which is to be made to the fund of the Des Monies Coliseum Company, organized to promote the business prosperity of the city.

The Western United Gas and Electric Company has made the final ($10,000) payment on the $25,000 sum which it agreed to pay into the city treasury of Joliet, Ills., when that city agreed to an extension of the Company charter.

The Employees' Association of the Bay State Gas Company, of Massachusetts, has made arrangements for the holding of the annual outing, which is to be held the 21st inst.

The Utica (N. Y.) Gas and Electric Company has purchased the building formerly occupied by the County Clerk, and will remodel the same to suit it as a business headquarters. The location is an excellent one.

The Fall River (Mass.) Gas Works Company had agreed to pipe gas over to Somerset at the urgent request of many residents of that section, provided the authorities would permit it to carry its main over, under, or along the Fall River Somerset bridge. Some days ago, however, the permission was asked for, and the joint Boards having control of the matter promptly returned a brief but emphatic denial. So Somerset will have to wait.

These figures go to prove that the shareholders in the Denver (Col.) Gas and Electric Company have little to fear from either bad or good times, its income account for the year ended July 31st, having been returned as follows:

	1908.	1907.	Increase.
Gross earnings	$2,062,326	$1,834,950	$227,376
Operating expenses	1,210,170	1,121,585	88,585
Net earnings	$852,156	$713,365	$138,791
Fixed charges	378,601	368,828	9,773
Surplus for div.	$473,555	$344,537	$129,018
Dividends	128,000	.....	120,000
Surplus	$355,555	$344,537	$9,018

THE Belfast (Me.) Gas and Elecric Company's new offices are counted amongst the show places of the once famous shipbuilding port.

AT the meeting of the Board of Directors of the New Haven (Conn.) Gas Company, held the morning of July 28th, to consider a proposition to increase the capital stock of the corporation, the following resolution was adopted:

"That the capital stock of this Company be increased by the issue, for cash, of sixty thousand (60,000) shares of the par value of $25 each, and that such stock be issued by the Board of Directors at such times, and in such manner, and in such amounts as they may deem for the best interests of the Company."

A CORRESPONDENT in Boston, writing under date of the 3d inst., incloses the following from the Boston *Transcript*, dated July 31st: "For a year to come the lighting of 12,312 lamps, gas and naphtha in the city of Boston, will be done entirely by contract, instead of by municipal lamplighters as at present. Superintendent of Streets, Guy C. Emerson, has decided to make a new contract with the Rising Sun Street Lighting Company, from August 1st until the close of business, July 31st, 1909. The contract is to be for only 1 year, and it is to be at the rate of $25.20 per lamp, the rate for which the Company recently made a proposal for a 5 year's contract. By making this new contract the city of Boston will save upwards of $40,000 on the cost of labor, and it is probable that still more will be saved by a reduction in the inspection force of the department. Personally, Superintendent Emerson would have preferred to make a much longer contract, but as it is the opinion of the Finance Commission that such action would be unwise, owing to the possibility of a desire to make a change of the lighting system in a year or two, he decided to act on their suggestions, at least in part. The Commission went so far as to suggest the making a contract for only a year or two for a limited number of lamps, say 7,000. To do this Superintendent Emerson thought would be unwise as he is of the opinion that all of the lights now in the city proper and suburbs are needed. Accordingly he took decisive action on the matter, and all that is needed to make it effective is the approval of Mayor Hibbard and the signatures to the contract of the Superintendent of Streets and the representative of the lighting Company. Until the summer of 1899 the city's lighting had been done by the municipal authorities, but as it was found to be costing the city more than if the work was done by contract, Mayor Josiah Quincy, on June 1 of that year, made a 7-year contract with the Rising Sun Street Lighting Company at the rate of $30 per lamp per year. That contract remained in force until May 30, 1906, although meantime the cost per lamp had been reduced to $28.20 per lamp because of the decrease that had taken place in the cost of gas. During the administration of former Mayor Fitzgerald it was decided to try once again the municipal plan, and after the contract with the Rising Sun Company had been continued for brief periods the system then in vogue was partly changed on May 1. 1907. The administration at that time found that it would be impossible to install a complete lighting plant of its own because of the expense that it would involve and it was decided that, while the city would buy its own gas direct from the Gas Company and would do its own lighting, it would have the Rising Sun Company furnish the lamps, mantles, etc. Accordingly, a new contract was made with the Company, by which it was paid at the rate of $9.30 for each of the 12,312 lamps per year. The gas has cost the city at the rate of $9.26 per lamp, and the lighting and care have brought the total cost up to $28.60. Now the total cost will be $25.20 per lamp. The present contract with the Company expired last week, but a few days ago the concern was notified by Superintendent Emerson to continue the present arrangement until he reached a final decision. Since the city took over the force of inspectors and lamplighters from the Rising Sun Company the force has been considerably increased. To-day, in addition to Acting Deputy Superintendent Edward C. Wade, who gets a salary of $2,000 a year, there is a clerk at $1,800, a messenger at $1,040, two inspectors who get $17.25 a week, two inspectors who get $3.60 a day, another who gets $2.50 a day and a foreman and a watchman who are paid at the rate of $17.25 a week each. In addition there are 132 gas lamplighters who are paid at the rate of $2.25 a day. There is one naphtha lamplighter who is paid $100 a month, and 6 others who are paid at the rate of 70 and 75 cents per lamp."

ON the 1st inst. the 12-ton flywheel of engine No. 5, in the power house of the North Adams (Mass.) Gas Company, got beyond control and burst, with the result that the power house was badly wrecked and the furnishing of electric currents to the city and its residents was seriously interfered with. The violence of the separation may be partially comprehended when it is said that a goodly portion of the disembered wheel tore through, crossed the Hoosac river and imbedded itself in the wall of the Arnold print works, over 150 yards away.

THE amalgamation of the Citizens Electric Company, of Keene, N. H., with the Keene Gas and Electric Company, has been completed. The latter is by far the dominant interest.

THE Massachusetts Board of Gas and Electric Light Commissioners will not hold any public hearings during this month.

GENERAL JOSHUA H. BATES, long a contemporary of the late General Andrew H. Hickenlooper, and for many years a Director in the old Cincinnati Gas Light and Coke Company, died at his home in the Burnet House, Cincinnati, the morning of the 26th ult. He was in his 92d year, having been born in Logan, O., August 24th, 1816. He served through the war with distinction, and for such service was brevetted a Brigadier General. His wife (last May they fittingly celebrated the 63d anniversary of their marriage) and five sons survive him.

MANAGER THOS. D. MILLER, in order that all visitors may have ample opportunity to judge whether or not the New Orleans Gas Light Company is up to the times, has secured ample floor space in the exhibit of the Home Manufacturers' Exhibition, which is to be brought off this fall in New Orleans.

THE Crocker-Wheeler Company has authorized the Western Gas Construction Company to construct for it a storage holder of 50,000 cubic feet capacity to be operated in connection with the blue water gas apparatus installed some time ago on the plant of the Crocker-Wheeler concern.

THE Carthage (Mo.) Gas Company has added largely to its main system this season.

MR. C. C. SLOAN, General Superintendent of the Calumet Gas Company, writing to the JOURNAL, from Calumet, Mich., under date of July 29th, says:

To the Editors AMERICAN GAS LIGHT JOURNAL: As I have not noticed any complete story of our increased selling price for gas, I presume you are not very familiar with the circumstances and take pleasure in relating them to you, for I believe the action of this Village Council is almost unprecedented in the history of the gas industry. As you are aware, we asked the Councils of the two villages we serve to revoke our original franchise and grant us revised franchises, permitting an increase from $1.08, net, per 1,000, the original price, to $1.25, net. The Councils, in informal joint session, appointed a committee of 4 to investigate our claims and ascertain selling prices of companies working under similar conditions. At the second joint meeting this committee reported that in its opinion we could not maintain proper sinking fund for renewal of plant and pay a fair return on money invested, and recommended a price of $1.25 for all consumption up to 10,000 cubic feet per month, and $1.20 for all above. These prices the Councils, at their regular meetings, approved and granted us new franchises accordingly. In this matter we acted in the most open manner, and found it the best, as well as the pleasantest, course to pursue. Our high cost for coal and labor, as well as the other unfavorable conditions under which we operate, helped our course. These with the open and fair minded men comprising the Councils, found that we were handicapped more than companies farther South, and won our petition. We based our claims on the proposition that every man who puts his money into public service corporations is entitled to a chance to receive a fair return and to more consideration than in any other form of business, as they are the only corporations limited by franchises as to price of product and manner of selling. We also claimed that a gas company should put aside 5 per cent. of investment each year for renewals and maintenance, and that all common stock was entitled to 8 per cent. per annum for this class of investment. We showed that in a town of this size we could not sell enough gas at $1.08 to do this. We were fortunate in not having any "trust busters," or other wild animals to deal with: all level headed business men, who wanted a profit and were willing to see others get one. The people have not raised any great objection since our new franchise was granted, as it was thoroughly discussed in the papers before, and all had a chance to object.

AT the annual meeting of the Hillsdale (Mich.) Gas Light Company the Directors elected were: J. W. Thompson, W. E. Moss, D. H. Taylor, B. O. Tippy and Geo. C. Turner.

THE AMERICAN GAS LIGHT JOURNAL

MONDAY, AUGUST 10, 1908.

The Market for Gas Securities.

The market in general ruled higher last week and Consolidated shared in the rise with the rest, in fact it more than shared, as the noon figure of to-day (Friday) shows—140⅞ to 141. It is still temptingly low, as will be amply proved by November first. The only people who really know the intrinsic value of Consolidated gas are the controllers of the First National Bank.

Brooklyn Union maintains its value fairly well, and hereafter holders can confidently look for an annual dividend payment of not less than 5 per cent. Peoples, of Chicago, is steady, and the same may be said of Massachusetts Gas Companies. Just think of it! Bay State gas at 2 and! *Mirabile dictu!*

Gas Stocks.

Quotations by George W. Close. Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

AUGUST 10.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$73,177,000	100	140⅝	141¼
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	93	93½
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	130	160
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	92	96
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	126	135
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	299,640	500	130	—
Out-of Town Companies.				
Bay State	50,000,000	50	1¾	2
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	309,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	90¾	91
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	87	88
Preferred	3,028,500	100	71	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,000,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co.	6,000,000	50	—	50
" Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" nc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	—	100
Preferred	2,500,000	100	60	90
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60¼
Massachusetts Gas Companies, of Boston	25,000,000	100	54½	55
Preferred	25,000,000	100	84½	85
Montreal Gas Co., Canada	9,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	95¼	95½
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	90¾	—
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington (D. C.) Gas Co.	2,600,000	20	323½	335
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	230	—

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In moderate sized or large gas company, by a man experienced in all departments, and who has made a record as manager of a small company.

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Guaranteed free of Repairs for two years. Condensation never reaches diaphragm, insuring longer life.

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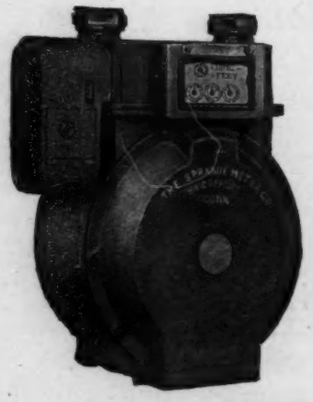

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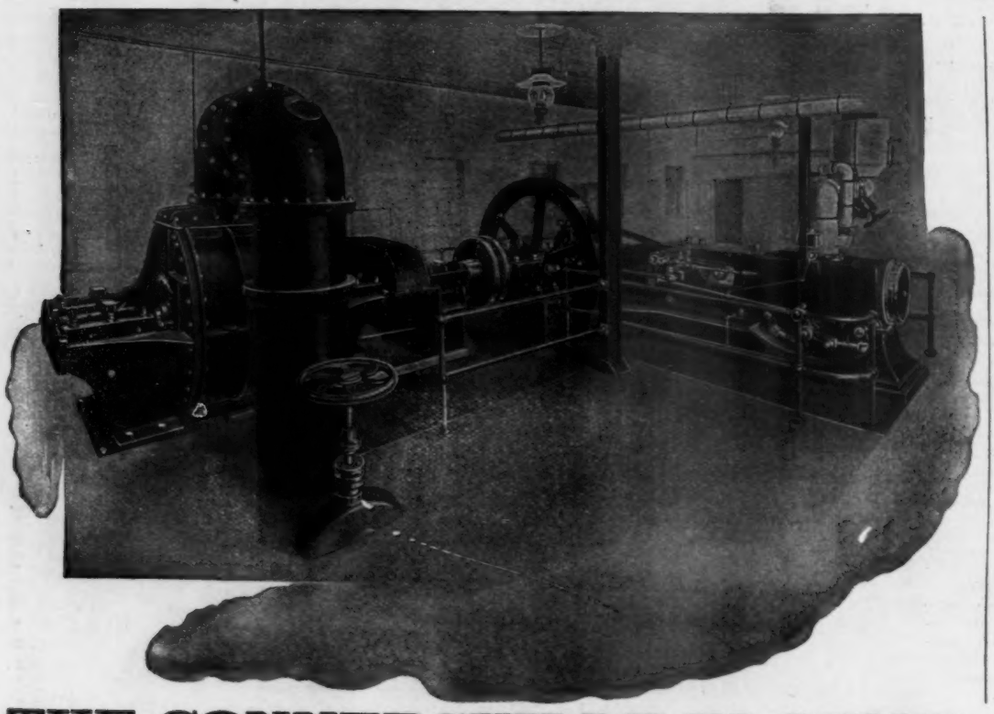

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—o—

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Correspondence Solicited.

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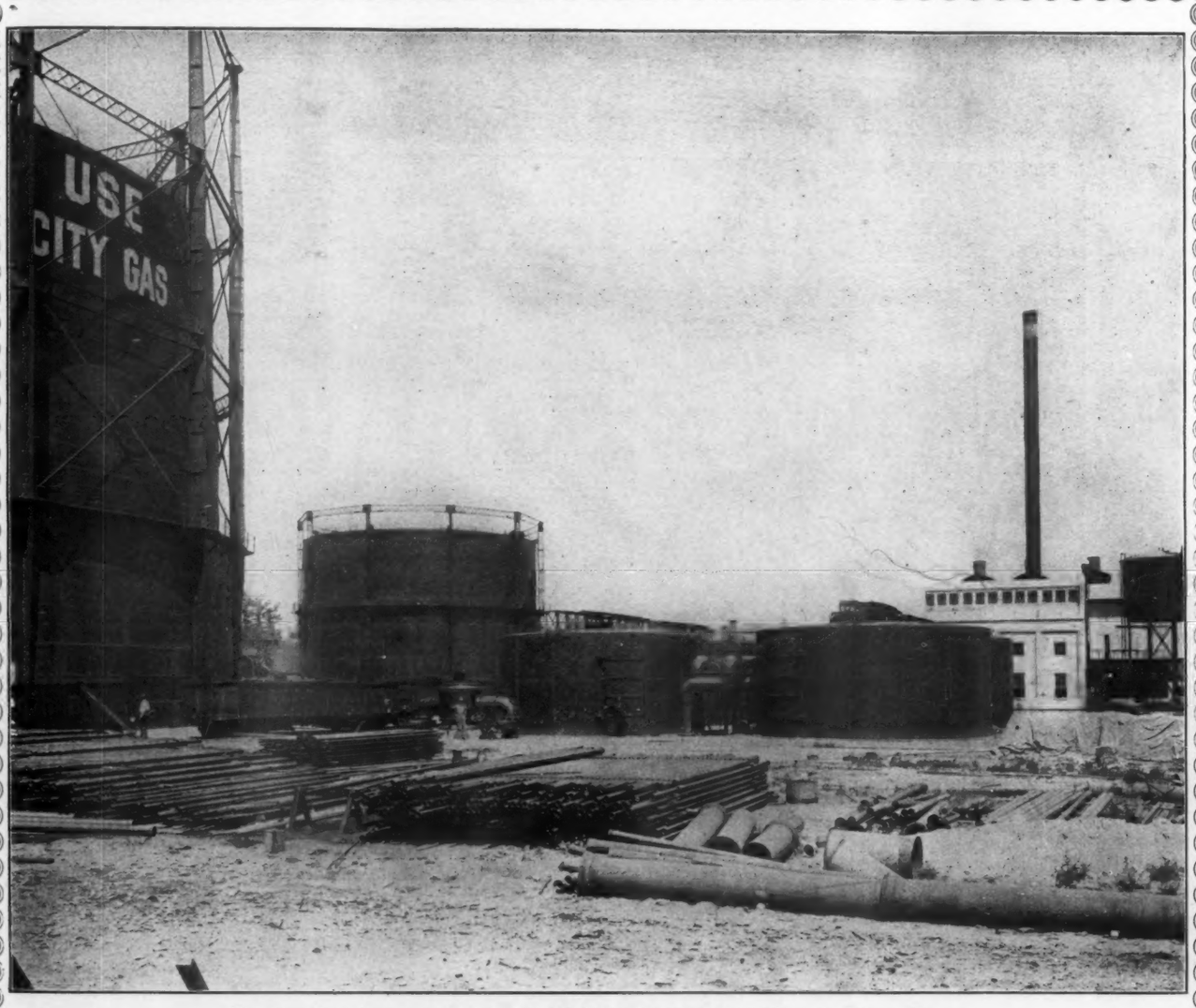

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We have Recently Contracted with the ILLINOIS STEEL COMPANY (United States Steel Corporation) for the delivery of

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Each Having a Capacity of **3,840,000 Cubic Feet per Day.**

These Machines will be Installed at Joliet, Illinois, to Measure Product of Coke Ovens Now Under Construction by that Company.

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P. PLANTINGA, President W. E. STEINWEDELL, Secretary

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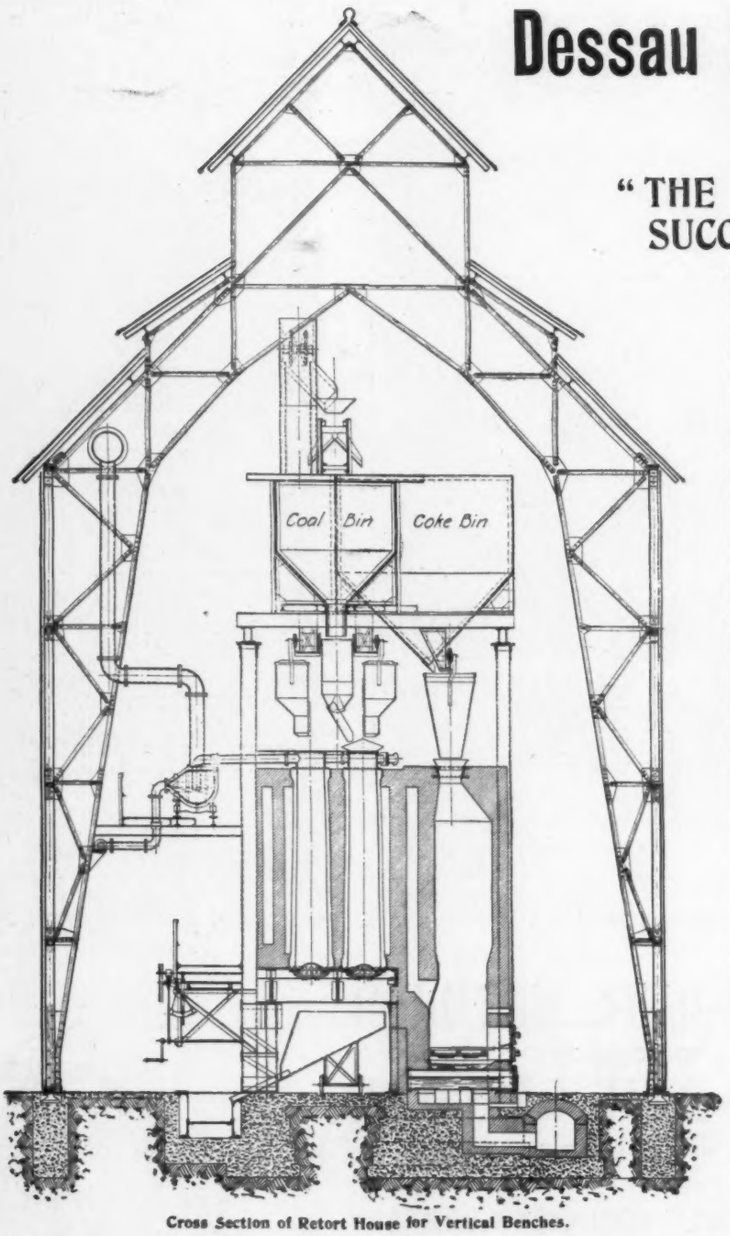
Dessau System of Vertical Retorts.

"THE ONLY SYSTEM IN SUCCESSFUL OPERATION."



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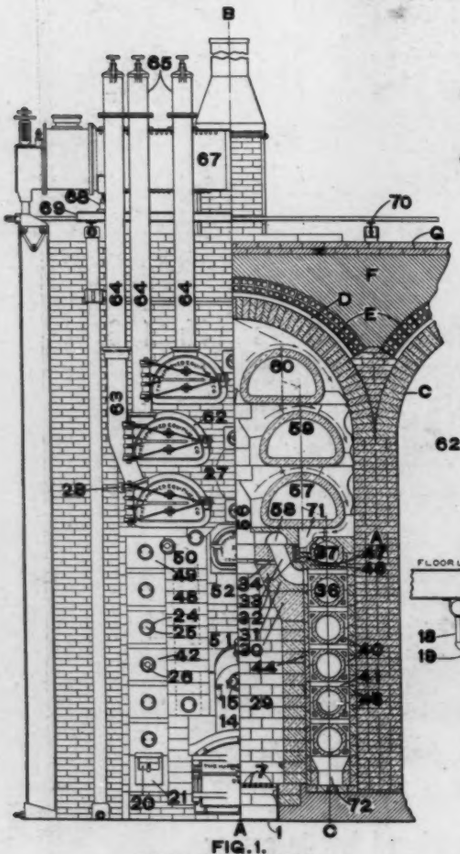

FIG. 1.
HALF SECTIONAL FRONT ELEVATION

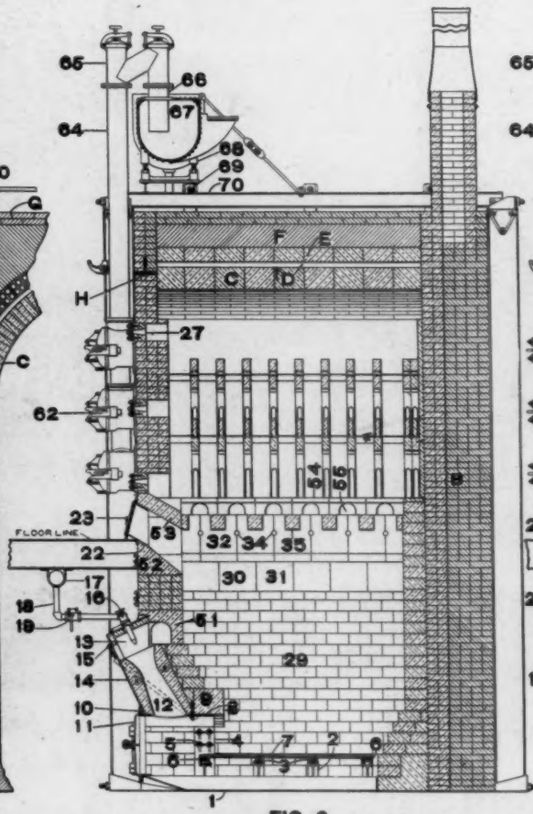

FIG. 2.
SECTIONAL SIDE ELEVATION ON A-B

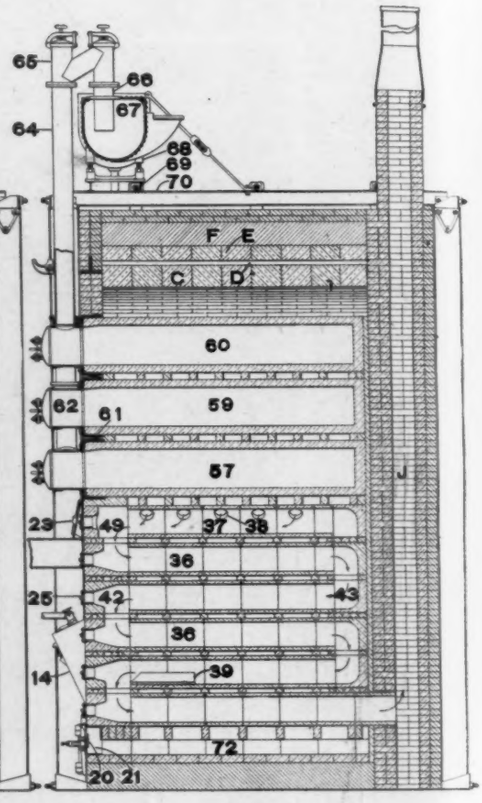

FIG. 3.
SECTIONAL SIDE ELEVATION ON C-B

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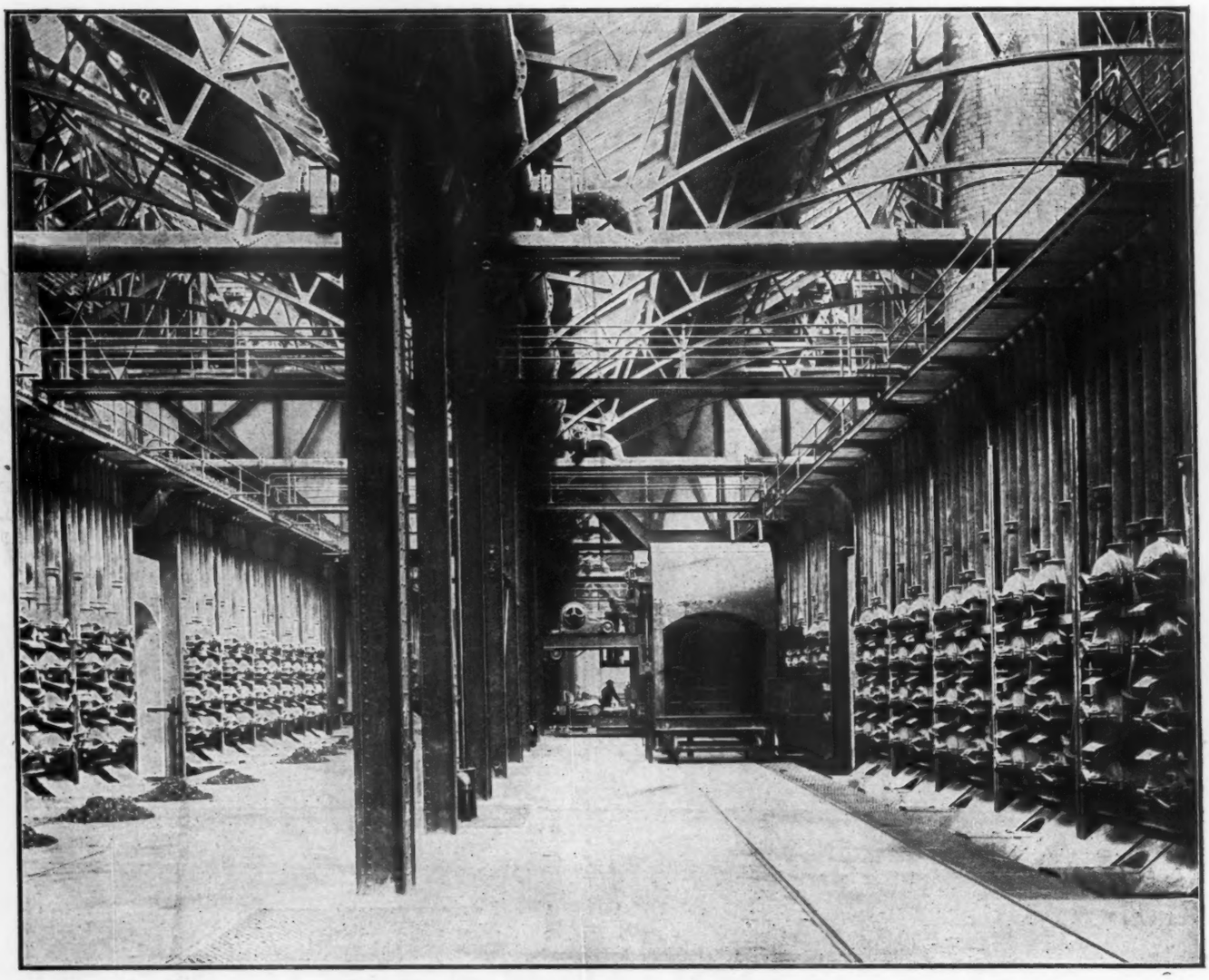

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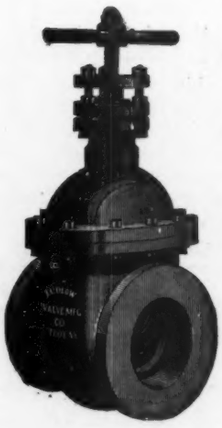

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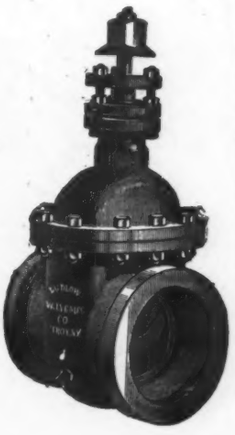

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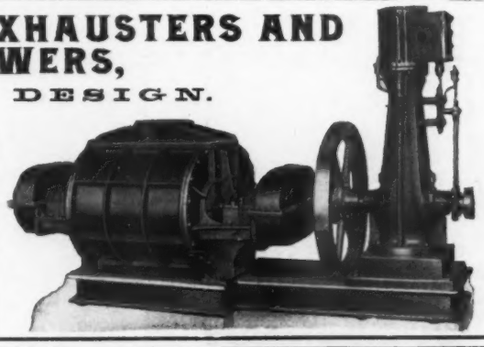

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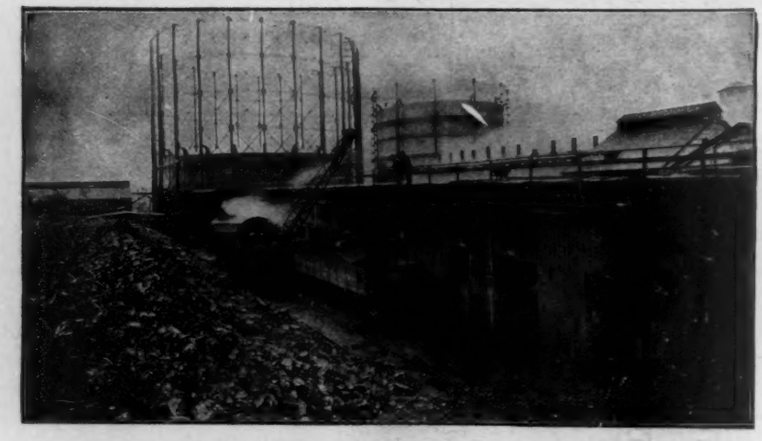

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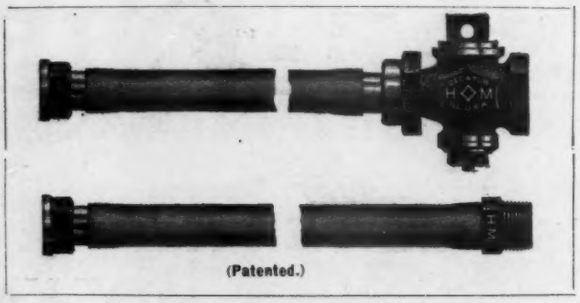

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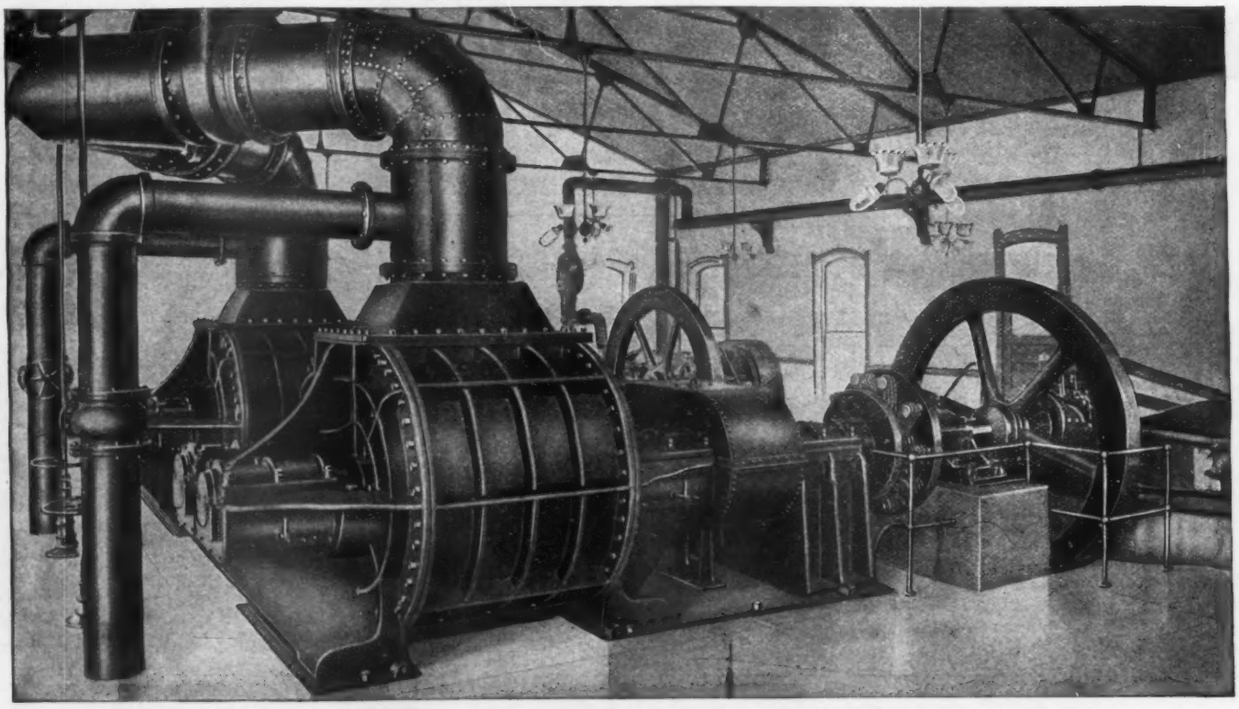

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PUBLIC LIGHTING TABLE.

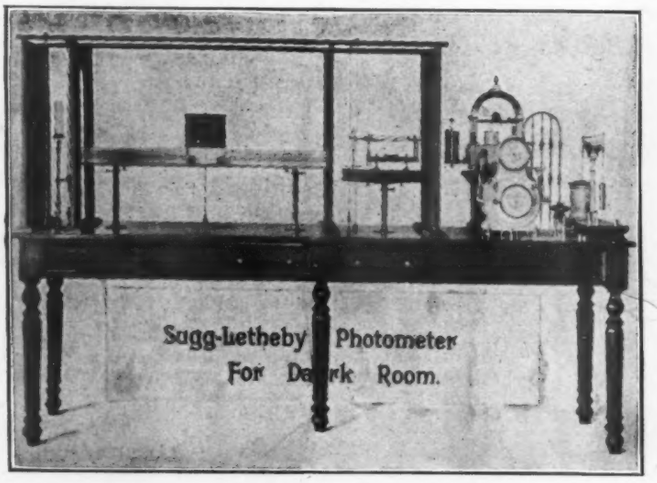
AUGUST, 1908.

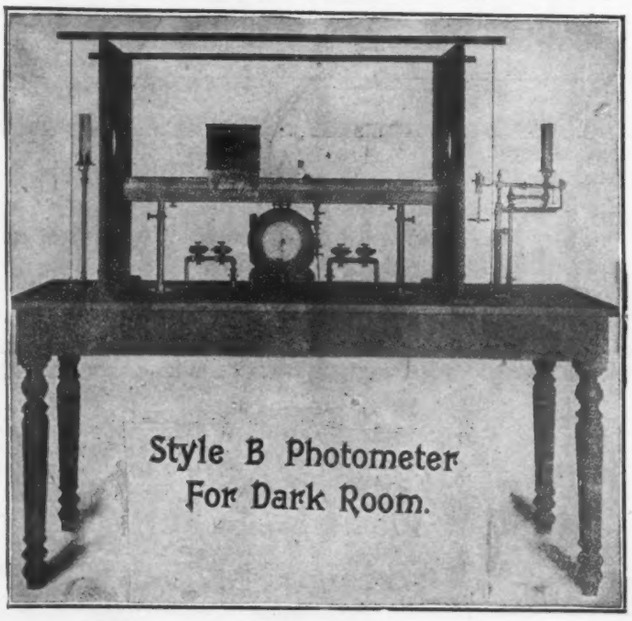
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Sat.	1	8.50 PM	4.00 AM
Sun.	2	9.10	4.00
Mon.	3	9.40	4.00
Tue.	4	10.00 FQ	4.00
Wed.	5	10.40	4.00
Thu.	6	11.10	4.00
Fri.	7	11 50	4.00
Sat.	8	12.50 AM	4.00
Sun.	9	1.50	4.10
Mon.	10	No L.	No L.
Tue.	11	No L FM	No L.
Wed.	12	No L.	No L.
Thu.	13	7.30 PM	9.20 PM
Fri.	14	7.30	10.00
Sat.	15	7.30	10.30
Sun.	16	7.20	11.00
Mon.	17	7.20	11.30
Tue.	18	7.20 LQ	12.00
Wed.	19	7.20	12.40 AM
Thu.	20	7.20	1.20
Fri.	21	7.20	2.10
Sat.	22	7.20	3.00
Sun.	23	7.10	4.20
Mon.	24	7.10	4.20
Tue.	25	7.10	4.20
Wed.	26	7.10 NM	4.20
Thu.	27	7.10	4.20
Fri.	28	7.10	4.20
Sat.	29	7.10	4.20
Sun.	30	7.10	4.30
Mon.	31	8.10	4.30

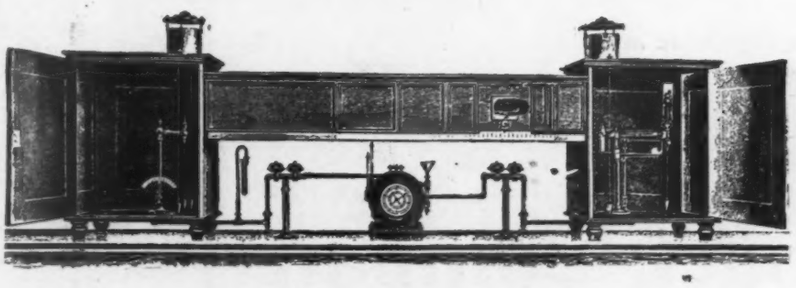
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs.Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







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PUBLIC LIGHTING TABLE.

AUGUST, 1908.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A. M.
Sat.	1	7.02	3.27
Sun.	2	7.02	3.27
Mon.	3	7.02	3.27
Tue.	4	7.02	3.27
Wed.	5	7.02	3.27
Thu.	6	6.57	3.37
Fri.	7	6.57	3.37
Sat.	8	6.57	3.37
Sun.	9	6.57	3.37
Mon.	10	6.57	3.37
Tue.	11	6.57	3.37
Wed.	12	6.57	3.37
Thu.	13	6.47	3.47
Fri.	14	6.47	3.47
Sat.	15	6.47	3.47
Sun.	16	6.47	3.47
Mon.	17	6.47	3.47
Tue.	18	6.47	3.47
Wed.	19	6.47	3.47
Thu.	20	6.37	3.52
Fri.	21	6.37	3.52
Sat.	22	6.37	3.52
Sun.	23	6.37	3.52
Mon.	24	6.37	3.52
Tue.	25	6.37	3.52
Wed.	26	6.37	3 52
Thu.	27	6.27	3.57
Fri.	28	6.27	3.57
Sat.	29	6.27	3.57
Sun.	30	6.27	3.57
Mon.	31	6.27	3.57

TOTAL HOURS DURING 1908.

	Hrs.Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguishing time	30.30
Total, yr.	3962.05

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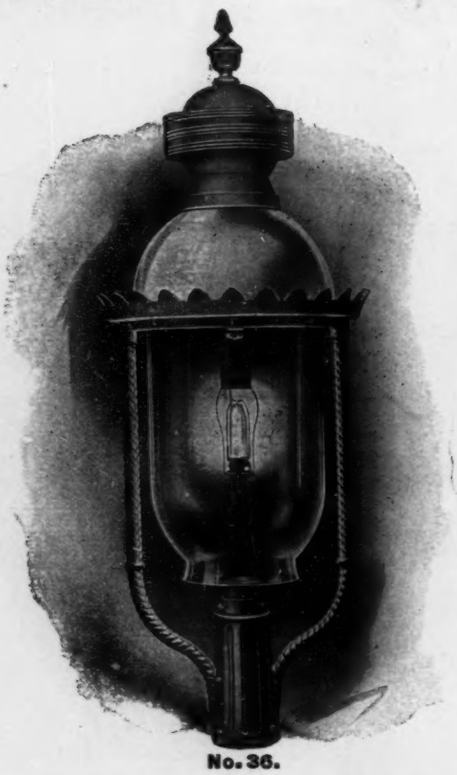

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Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
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New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfolk, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.
Arlington, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
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TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

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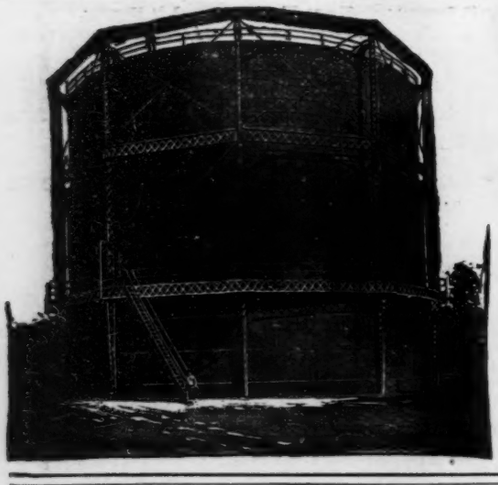

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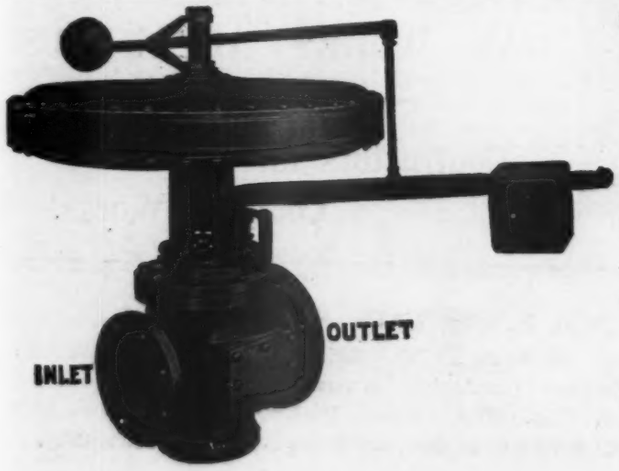

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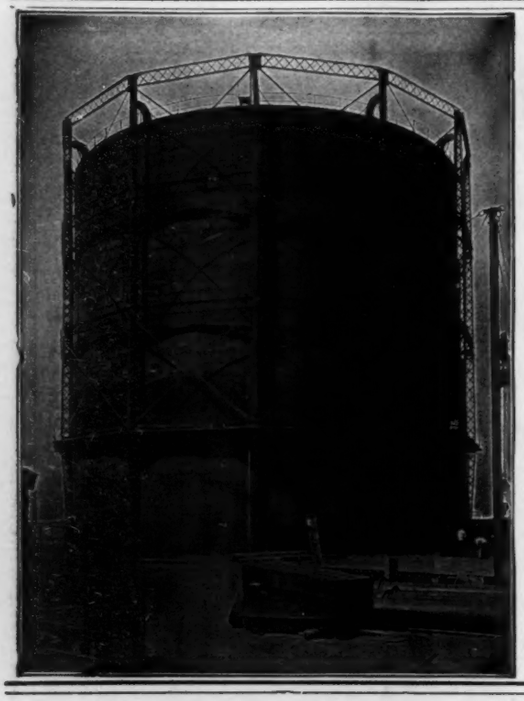

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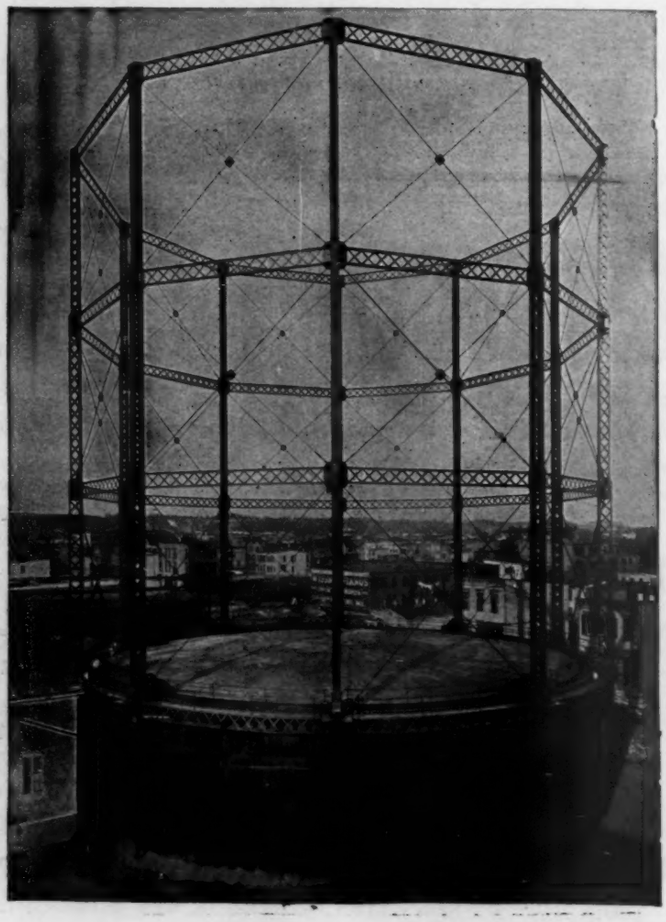

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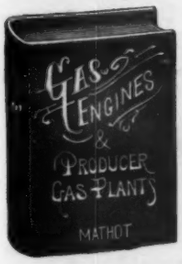

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